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CONTENTS

May 15, 1933

THE WEEK IN PERSPECTIVE	9
The Voice of Industry	10
Government-Industry Partnership Nears	11
Air Conditioning, a 100,000-Ton Steel Market	13
Steel Rate Up to 36; Still Advancing	15
Obituary	16
Personals	17
Mirrors of Motordom	18
April Ingot Output Up 61 Per Cent	19
EDITORIAL—Steel Lags in Co-operation with U. S.	20
THE BUSINESS TREND	21
Develops Alloy Steels for Heavy-Duty Forgings	23
Find New Copper Plating Process	25
Gear Makers Air Industrial Ills, Technology	26
Perfects Improved Cement-Lined Steel Pipe	27
Discuss Engineering for Recovery	28
Improving Open-Hearth Design—Part V, Continued	29
Making the Most of Methods and Materials	31
Large Uses of Steel in Small Ways—Ship Anchors	32
Progress in Steelmaking	34
New Equipment	34
MARKET REPORTS AND PRICES	37-53
CONSTRUCTION AND ENTERPRISE	54
ADVERTISERS' INDEX	60

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294.38 MILES PER HOUR

WITH JIMMY DOOLITTLE

Major Doolittle's record-breaking Gee Bee Supersportster, equipped with Smith Controllable Pitch Propeller, made by Smith Engineering Co.

PILOTING a trim Gee Bee Supersportster . . . deftly adjusting the angle of his Smith Controllable Pitch Propeller for every last bit of speed and power . . . Major James H. Doolittle, ace of speed flyers, achieves a world's land plane record of 294.38 miles per hour! « Think of the punishment taken by the steel hub and blades of a propeller turning at 2400 per minute! Think of the additional strains and stresses as the pilot adjusts the pitch of a propeller turning over at that almost incredible speed. Severe service? Metallurgists who have spent years in the development of alloy steels . . . aeronautical and automotive designers . . . men who have fabricated steel for the most unusual applications—all are agreed that nowhere is there a more severe test of alloy steel. « Hub, nuts and other parts of the Smith Controllable Pitch Propeller are made of Agathon Electric Furnace Steel. Most of the steel, incidentally, is of the S.A.E. 6100 series—steels now standard but first offered to industry as Agathon special analyses steels. « You can trust the prestige of your product—as Jimmy Doolittle trusts his life—to the quality and dependability of Agathon Alloy Steels.

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AGATHON STEELS

Volume 92 Number 20

STEEL

For forty-eight Years—IRON TRADE REVIEW

PRODUCTION • PROCESSING • DISTRIBUTION • USE

The Week in Perspective

A NEW firm is being organized in Washington, called Government & Industry. Government itself has not done so well, running behind over a billion dollars in the past year, but it now is under new management and is so concerned over the condition of industry that it is proposing a partnership (p. 11). Of course, there is a *quid pro quo*. Industry will fix its own prices, equalize production, write rules for its regulation, may even have a key to the cash box, while Government will keep the books, see that labor is fairly paid, maintain discipline and make sure the customers are satisfied. Industry traditionally is averse to such a partnership, but it may prove a lesser evil than failure, and besides, the invitation to join is really a command.

Steel Rate Rises as Federal Aid Nears

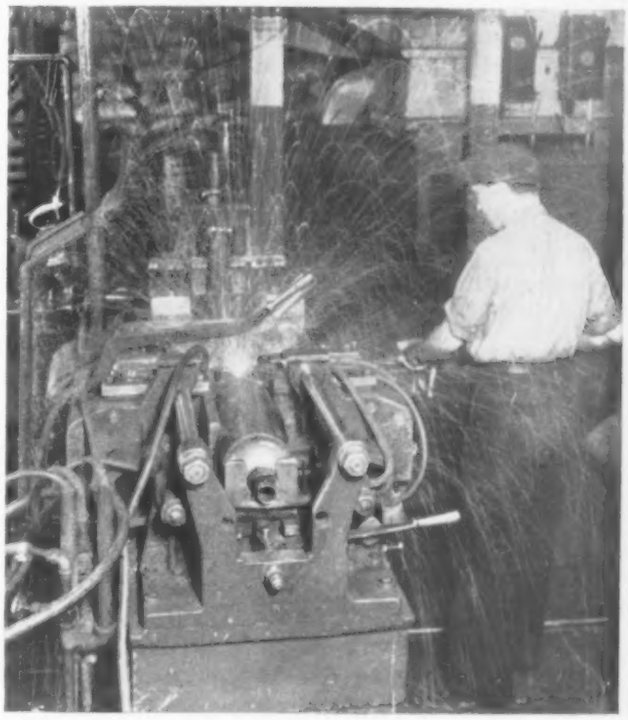
While the incorporation papers for this firm are being prepared for filing with congress this week, the iron and steel branch of industry is giving a display of activity that, a year ago, would have averted such a "new deal." . . . Up 3 points, steelmaking operations (p. 15) are at 36 per cent, highest since June, 1931. . . . Demand has not only supported such improvement but is also building up backlogs for mills (p. 37) and deferring deliveries. . . . Steelworks cannot get enough scrap, one mill alone closing on 260,000 tons (p. 48). Scrap prices, however, are stymied behind pig iron. . . . Some tin plate mills are operating 100 per cent (p. 41). . . . Pig iron shipments (p. 47) already in May are exceeding April's.

Auto Industry at 60 Per Cent

This improvement in the iron and steel markets has originated largely in orthodox sources, notably the automobile industry. The news from Detroit (p. 18) is that current production, on the basis of 1924-9 being normal, rates at 60 per cent; Chrysler is notifying dealers prices may advance; the first Ford advertisement in a year is significant; Reo with its new transmission adds weight to the tradition that the smaller manufacturers do the pioneering. . . . A steel trailer which can be attached to an automobile with a high degree of safety and roadability is being built (p. 25) for transporting race horses. Bar mills are particularly interested in this new use.

Steel Indispensable to Better Air

A new market for steel from which more will be heard as recovery gains momentum is air conditioning (p. 13), estimated at a 100,000-ton outlet for finished steel, chiefly sheets. For heating, cooling, humidifying, dehumidifying, ventilating and allied uses air condi-



This spectacular operation results in a quieter Ford truck. An operator at Fordson is flash welding the inlet pipe to the intake head of a muffler used on 4-cylinder commercial cars

tioning has proved its way. Higher tensile strength with less weight and greater resistance to corrosion are problems this new industry puts up to the metallurgist. . . . Beer also has its place in a broader steel market. Another type of welded steel beer barrel constructed (p. 28) with an inner and outer shell is rustproofed, pitch-lined and insulated.

Something New in Forgings, Refractories

To meet the demand for higher physical properties in heavy-section forgings, a Chicago manufacturer has developed (p. 23) a series of nickel-chrome-molybdenum steels which give desirable physical and depth-hardening properties. There are characteristics, too, which fit them for lighter sections. . . . A new development in refractories is a firebrick (p. 28) with properties midway between fireclay refractories for moderate service and higher grades of firebrick for heavy-duty furnace work. . . . Refractory prices (p. 47) have caught the spirit of the times and are advancing $2.50 to $7 per 1000.

One Minute, and Coating Is On

A satisfactory copper coating can be obtained in one minute by a newly-developed process (p. 25) which claims safety, relative stability and economy as its chief features. Low current density can be employed, with the new combination of chemicals replacing dangerous cyanide in the bath. . . . The antithesis of this is a new type of cement-lined pipe (p. 27), the lining having low solubility in corrosive solutions. . . . An acid-resistant material with a sulphur base is offered (p. 33) for pointing joints in acid-proof masonry and for lining concrete tanks.

Through the Week With the Engineer

An economy of plenty has succeeded an economy of scarcity, was the sentiment at the Cleveland conference on re-engineering for economical manufacture (p. 28), requiring major attention to selling and distribution. . . . Three leading steel producers have ordered (p. 50) single-stand 4-high cold strip mills. . . . Ship anchors, largely of cast steel, consume (p. 32) 500 to 600 tons annually. . . . Suggested values for temperature are helpful (p. 29) in determining gas fluid velocity through the open-hearth furnace. . . . An industrial drama, portrayed by members, graphically depicted (p. 26) to the recent Gear Manufacturers' association convention in Pittsburgh the merit of intelligent selling, fair buying, honesty in price, and quality workmanship and materials.

The VOICE of INDUSTRY

Communications appearing here do not necessarily reflect the opinion of STEEL *or of its editors.*

Suggests Policy for Engineering Fees

To the Editor:

In these days of economic upheaval and new deals, no one can doubt the necessity for business leadership and ability, after a cycle of rank speculation and the poorest business economics in the history of American industry.

The problems of production and distribution were never so complicated nor so difficult to solve, and this burden still rests on the shoulders of management.

There are, no doubt, many instances today where competent management can effect salvation of a business, and if officers and others financially interested hold any doubts as to their future, competent engineering assistance can and should be procured.

Some engineers furnish assistance to management or even take full responsibility for all operations of their clients. Sometimes—too often, in fact—such services involve introduction of some particular system into an already overburdened organization. At times they hit the mark; sometimes they do not.

If necessary, the engineer must be prepared to improve the product, or even find a new product. This phase of industry is often overlooked, or, at least, not always provided for by engineers.

The outlet problem is undoubtedly the most troublesome for many clients, and an extensive market survey is nearly always of some value, but in order to afford immediate relief to a corporation, it may be necessary to proceed without such survey. A good policy is action and immediately, and then, if necessary at a later date a comprehensive survey of possible outlets, but a policy must be definitely established first, so as to get some productive work and results accomplished.

In such situations, no known system will be of any value; as a matter of truth, system comes in at the tail end of a trail that is usually winding, uphill and rough, and an engineer working on such problems must have talent at his command so that the client will receive the prompt assistance to which he is entitled.

Such engineering must be versatile and mobile, since the problems to be solved may involve any or all of the following: Finance, physical product (old and new), sales and production, and finally some convenient and complete system for co-ordination and presentation of essential facts, and further might involve activites in a foreign country.

The engineer's problem should always be: Where are the profits, and how can they be obtained?

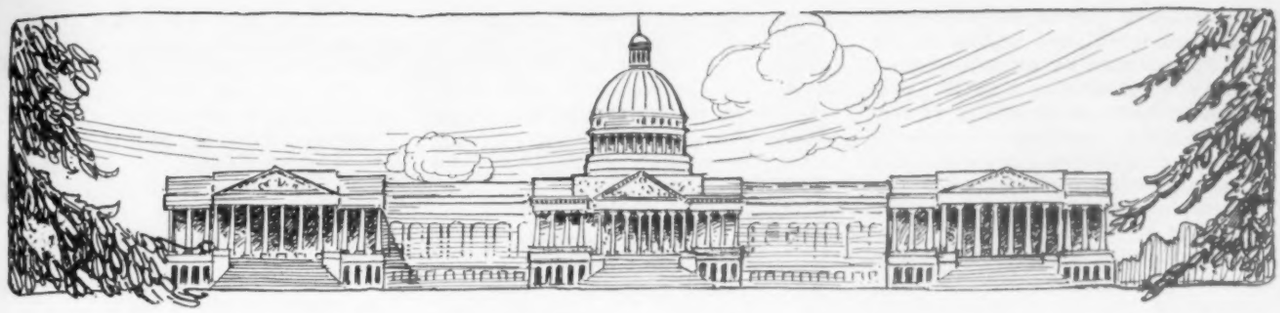
Too often a manufacturer is sold a survey, a system or an analysis, for a fee, without any knowledge or regard as to whether or not there is the possibility of beneficial results to the client; in other words, in too many instances the client is sold a beautifully bound volume of a hundred or more pages, with his name embossed in gold on the leather cover.

In the light of these facts, we maintain that an engineer, before charging a fee, should first of all honestly decide whether or not such service as he can offer will be of value to his client, and if not, then no fee should be charged, and it would be a good thing for the profession, also for industry, if this greed for an unjustified fee were eliminated by engineers.

C. H. Morris,

Morris and Van Wormer

50 Church St., New York



GOVERNMENT-INDUSTRY PARTNERSHIP NEARS

WASHINGTON

A PRESCRIPTION for restoring health to industry and prosperity to the nation was being written in Washington over the week-end by two senators, a cabinet officer whose chief concern is a square deal for labor, an attorney for organized labor, a college professor become an assistant secretary of commerce, and a farm implement executive.

This special committee, appointed by President Roosevelt May 10, was rewriting what has generally been termed a national industrial recovery bill, consolidating its objectives with a public works program which may appropriate $3,300,0000,000.

The most important legislation affecting industry since the World war, the bill may be obscured a few days by the appearance of J. P. Morgan before the senatorial inquisition, but its introduction this week and passage before congress adjourns early in June appears certain.

Orderly Competition Is Goal

Manufacturers regimented in appropriate trade associations or institutes to establish wage rates and work weeks calculated to improve the lot of labor and enlarge its purchasing power, to fix prices that are fair to consumers and remunerative to producers, to determine quotas insuring an equitable distribution of business over an industry—such is the Roosevelt formula.

For harassed producers in all industry this program suggests the fulfillment of a dream—the restraint of those elements which have been slashing wages and prices ruthlessly and the restoration of orderly competition and fair prices.

On the other hand, this partnership of government and industry, as the President puts it, involves a measure of government control not experienced since the war industries board was demobilized, and contains the hazard of permanent federal supervision following the emergency period of two years.

In advance of the exact phraseology of the bill, the iron and steel industry appears likely to be confronted with these serious considerations:

Labor is to sit at the table with management, and in an unorganized industry like steel who will represent labor, and will the occasion be seized as a spearhead to organize the industry under the aegis of a friendly national administration?

Considering the wide divergence of costs, how determine a price that will not extinguish the high-cost producer, yet not be unduly profitable to the low-cost producer at the expense of the consumer?

How reconcile the wide disparity in labor conditions and wage rates between various producing districts and establish a base assuring fair competition?

Since mill practice and products frequently lead a consumer to prefer one producer over another, how supply consumers their exact needs without undue concentration of orders with the preferred maker?

But those close to the administration are certain that these considerations can be harmonized if the industry is rightly minded. The attitude of the administration is that, radical as the Roosevelt formula appears, it represents action. Industry itself has not been able to pull itself out of the rut, hence resort to the so-called "brain trust."

Only One Knows Industry

Industry and the members of the drafting committee, except one, have no intimate acquaintance. On the committee are Senators Wagner of New York and Walsh of Massachusetts, Secretary of Labor Perkins, Donald Richberg, Assistant Secretary of Commerce Dickinson, and Gen. Hugh S. Johnson, adviser to Bernard Baruch and associated with him when he was chairman of the war industries board. General Johnson, who has been in the implement business in Moline Ill., is regarded as the only practical industrialist on the committee.

There have been two separate concepts of the industrial recovery bill, the chief difference being permitting industry to write the rules for its regulation or including specific limits in the bill. The former viewpoint appears dominant.

Subject, of course, to final revision over the week-end, the Roosevelt plan is substantially as follows:

A board of five to be set up—the secretaries of labor, interior, commerce and agriculture, and a civilian to be named by the President and to be chairman. It should be understood that the administration is dealing with personalities and not offices. Some embarrassment may be avoided

Sees Industry's Salvation In Rationalized Regulation

IT IS A HOPEFUL sign that business, transportation and agriculture, stimulated by the new administration at Washington, are departing from orthodox procedure of the past and seeking new and better ways of doing things," declared James W. Hook, president, Geometric Tool Co., New Haven, Conn., before the New England Council, May 11.

"At last our leaders have recognized that great and fundamental changes in our mode of living such as have been experienced in the past 30 years should be accompanied with changes in our economic conceptions and controls.

"The old notions of unbridled competition, wild and baseless expansion of producing capacities, and unregulated movements in the speculative field are rapidly giving way to a belief in rationalized regulation as a means of saving us from our own selves."

by leaving off the attorney general, who is charged with enforcing all laws, including the antitrust laws.

The cabinet officers each to name a representative with voting power, presumably an assistant secretary; an advisory committee much like the council of national defense to represent employers, employes and the disinterested public—if any.

Realizing that it cannot deal with manufacturers individually, the government is turning to trade associations or institutes. Where there is no such organization the government will foster one. If an industry refuses to organize, the government itself will lay down the regulations.

For their respective industries these associations will formulate regulations for self-control, always with these two objectives in mind—to raise commodity prices and to increase employment.

Price fixing is not openly discussed, but it cannot be avoided. The bill is not expected to provide blanket exemption from the antitrust laws, but the board of five will be empowered to waive these laws when in the public interest.

May Loan to Industry

Provision also is being made for government loans for rehabilitation purposes.

Until the bill actually is introduced, there can be only conjecture concerning the physical setup, but it would appear that the proposed civilian chief of the control board will be a czar of industry such as the nation has not yet seen, and that a vast amount of machinery must be provided for the necessary supervision and contacts with each industry.

Incidentally, some Democratic members of the house caucused Wednesday night to forestall any relaxation of the antitrust laws, but in vain. The attempt was led by Representative Patman, who will be remembered for his sponsorship of the bonus issue and his advocacy of printing greenbacks for paying the bonus.

Trade Codes Will Govern

The Sherman act, it will be recalled, was first to prescribe certain business practices as illegal. The Clayton and the federal trade acts subsequently enlarged this illegal domain. The proposed bill will go still further and permit the board of five to approve trade codes, declaring certain practices illegal. These codes will be the weapon for dealing with consistent price cutters, the lone wolves who refuse to join associations and the predatory manufacturers who persistently upset markets. A fine or imprisonment will be the penalty. Some sort of license system probably will prohibit the product of any recalcitrant manufacturer moving in interstate commerce.

This unfair practice code probably will be the teeth in the measure and will vary according to industries. A majority of any industry will govern, but this majority may be on the basis of capacity or of members, as each industry decides with the approval of the board.

The United States Steel Corp. and Bethlehem Steel Corp., for example, constitute a majority of the steel industry in point of capacity, but all other manufacturers are in a numerical majority.

There appears to be a deep-seated confidence that the righteous elements in industries will be the strong elements and will prevail.

The trade association thus becomes an all-powerful body, and building managers in Washington expect a rush for space from those without present headquarters here.

For iron and steel, a number of complications are foreseen and new policies become mandatory. The policy of the Steel corporation, for example, of practically refraining from membership in trade associations probably will have to be modified.

On the other hand, the Steel corporation's problem of co-operation is simplified by the breakdown of its production into specialized subsidiaries. Thus the National Tube Co. and the American Steel & Wire Co. will fall easily into the pipe and wire groups, whereas the Bethlehem Steel Corp. and others manufacturing these products must straddle.

Presumably the American Iron and Steel institute will represent the heavy portion of the industry. Other well-organized groups ready for immediate action are typified by the American Institute of Steel Construction, the National Association of Flat-rolled Steel Manufacturers and the Concrete Reinforcing Steel institute.

Perkins' Contacts Limited

Neither industry nor the Roosevelt advisers have laid much emphasis upon the labor angle, but industry is apprehensive that this issue, especially in the unorganized ones, may prove crucial. Where, as in steel, there is no organization to speak for labor, the views of Secretary Perkins may prevail, and these views are largely based on experience with the lighter, organized industries found in New York state. Labor exercising equal rights with management will be a new experience for some industries.

The matter of costs is also likely to prove a troublesome one. At this time the larger integrated units may well prove to be the high-cost ones, contrary to the experience in lush times.

Only 12 years ago the iron, steel, coal and coke industries put up a stiff court fight when the federal trade commission demanded monthly reports on production costs. The commission won on points in the Claire furnace case, but refrained from pushing its advantage. Some of the President's advisers have sounseled provisions for examining the books of any producer whom a majority in any industry contends is a price and wage cutter.

In presenting the side of industry to the President's advisers the National Association of Manufacturers has been active. R. P. Lamont, president, American Iron and Steel institute; Charles R. Hook, president, American Rolling Mill Co.; William B. Gillies, vice president, Youngstown Sheet & Tube Co.; George S.

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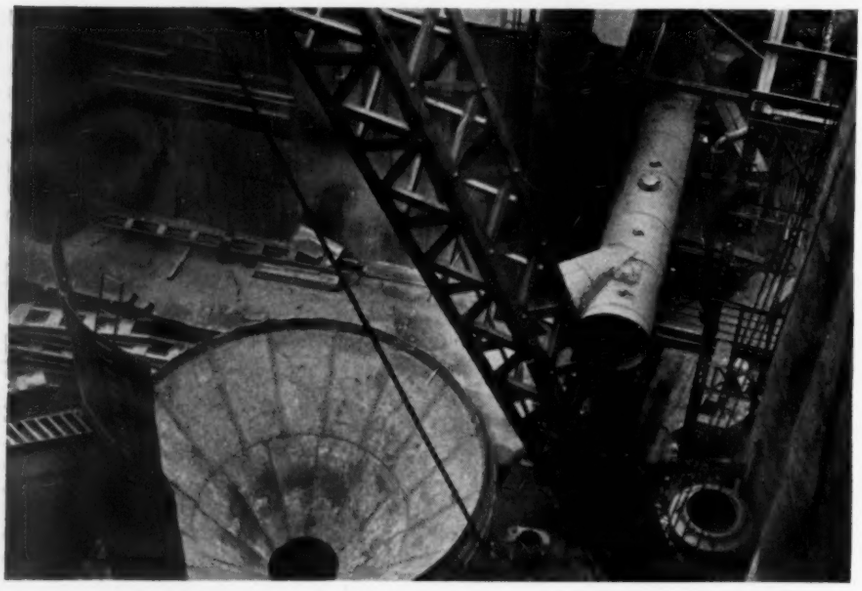


AN INFERNO TAMED:—View of the Soho blast furnace stack, Pittsburgh, which Jones & Laughlin Steel Corp. began demolishing in January

Air Conditioning, 100,000-Ton Steel Market, a Recovery Aid

A 100,000-ton market for varied steel products is conjectured in the air conditioning industry with the return of normal business!

For 15 years previous to the abnormal boom period of 1928-29 this industry doubled itself in the value of contracts every four years. This expansion is far more rapid than that registered by the average. The radiator industry volume, for instance, is normally estimated to double its expansion every 10 years.

Since the depression, demand for air conditioning equipment has been arrested, the drop has been practically in line with that of general industrial bookings in dollars. Under normal conditions the volume for 1933, conservatively estimated, would have been close to $25,000,000.

That air conditioning will be among the leaders in the building field to come back is evident by the large volume of projects being or already figured. Before the recent banking holiday, some substantial inquiry had been revived after a dormant period of two and three years. Few large modern commercial and industrial structures in the future are likely to be designed without air conditioning in some form.

However, in the first increase in demand for such installations, inquiry is likely to develop for equipment in buildings already erected. Hundreds of such structures went up during 1928-29 without such installations and these will probably give the first impetus to the recovery. Despite the depression, competition in the air conditioning field has increased.

Galvanized Sheets Needed

The use of steel and nonferrous metals in this sphere is extensive and varied. It offers a large outlet for galvanized sheets, mostly No. 18 to 24 gage, for air ducts. More than 20,000 tons were used in 1932, a subnormal year.

The varied requirements also include angles, plates, castings, piping, fans, blowers, motors, special air washing apparatus, control equipment, heating and cooling units and a mass of varied steel and nonferrous materials. Ducts and guide vanes conducting the conditioned air, as to humidity and temperature, are erected and fabricated by the crimp method, with standing seam and panel construction.

Each air conditioning project is a separate engineering problem. Fundamentally the principles of procedure are much alike, but actual engineering details and installation vary on each project.

Air conditioning is a broad term. It may involve one or all of the following: Heating, humidifying, ventilating, air filtering, cooling, dehumidifying, refrigeration, air washing and automatic regulation as to humidity and temperature.

Value Has Been Proved

Air conditioning is not a new or untried industry. Textile and tobacco plants have incorporated its advantages for 30 years or more. Its practicability and real economy have been proved so many times and in so many varied fields—industrial, commercial and social—that its advantages are becoming more and more self-evident for general application. More than 200 different industries now make use of air conditioning as a manufacturing necessity, and cows, gorillas in zoos, senators at Washingon and theater audiences have been made more comfortable by such installations.

As for steel tonnage possibilities, there seems to be no doubt that steel requirements for air conditioning will follow identically the curve of air conditioning volume itself.

Robert S. Parks, chairman, Parks-Cramer Co., Fitchburg, Mass., discussing the future of this industry says:

"If we like to work in factory and office, shop in stores, be entertained in theaters, sleep in hotels and eat in restaurants equipped with certified climate, it follows that we are going to like the same conditions in the home. And it follows also that anything so conducive to health and comfort will become a more common and accepted necessity where people work, assemble, live or are served.

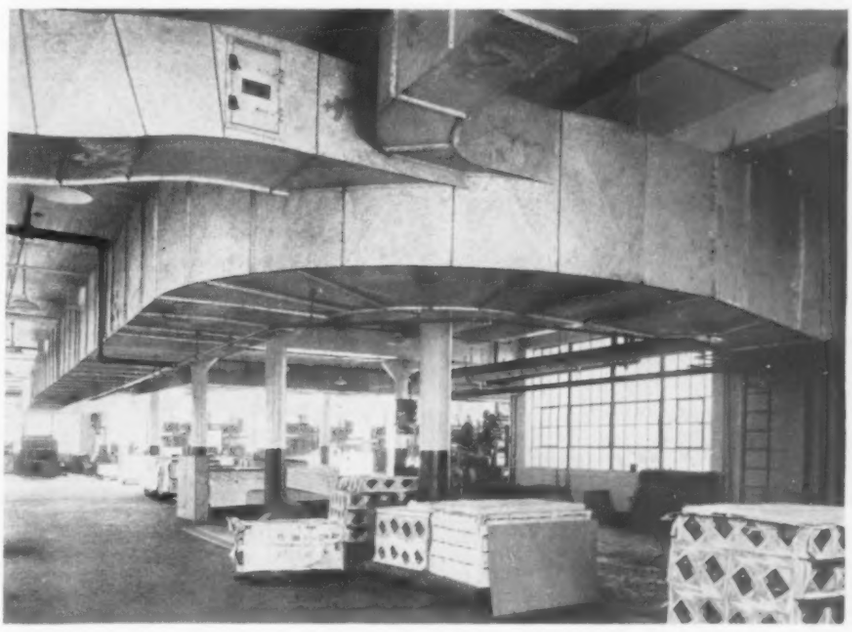
"I see for air conditioning an expansion which, if presented in the form of a curve, might appear fantastic. One authority is on record predicting an annual volume of more than $250,000,000 in certified climate within 20 years."

Air conditioning cannot be done without steel. In every installation there is the possibility for the use of blowers, motors, air-washers, refrigerating units, heating units, piping, sheet metal ducts, castings, hangers, rivets, screws and bolts. In most of these, the use of steel is predominant.

New Problems for Steel

It may be that air conditioning construction will develop new problems for the steel manufacturer. Resistance to corrosion is one. Higher tensile strength with less weight may be another. The steel manufacturer who will put his research staff to work for a solution of even these two problems will help in the step-up of the business that will surely be available, according to Mr. Parks.

The design of buildings—homes, particularly, is likely to undergo a marked change. Present design of



SHEET STEEL DUCTS BRING "CERTIFIED CLIMATE" TO THIS PLANT: Temperature and humidity control is one of the essential features of a modern lithographic printing plant. Each air conditioning installation for large industrial establishments is an engineering problem in itself

homes is not well adapted to air conditioning. Walls and roofs should be insulated; windows double glazed (perhaps the new house will not have any windows). Spaces should be provided for ducts and ducts be a part of the building.

With lighter and stronger shapes, steel might be substituted for lumber for certain standardized parts and shipped ready to install.

"Are not the prospects for the steel manufacturer with vision as alluring as those of the air conditioning manufacturer?" asks Mr. Parks.

Ice is being used in air conditioning work to an increasing extent. Studies in development work made on this particular subject in the past two or three years seem to hold a great deal of promise to absorb the production of ice plants which used to be purchased by people who now own electric refrigerators. These types of installations are quite simple, requiring only an ice melting box with spray nozzles and a pump to circulate water through the spray nozzles and over the ice plus, of course, the metal ducts to and from the room or rooms which are to be cooled.

Robert S. Wheaton, Vilter Mfg. Co., Milwaukee, says:

More Builders Seen

"In the last year or two we have extended our activities in this line, until now we are in a position to take care of the entire air conditioning plant, and we have done this because we believe air conditioning plants will be installed in greater numbers than ever before.

"There are many restaurants, theaters and other public buildings which are thoroughly sold upon the idea, but lack the necessary funds to proceed with the work. Certain manufacturing plants have need of conditioned air, to maintain the excellence and uniformity of their products."

Practically all the large departmental buildings erected at Washington during the last two years are air conditioned. Installations have been made in older structures, including the senate and house chambers, by the Carrier Engineering Corp., Newark, N. J., W. H. Carrier, president of that organization, being a pioneer in the modern development of air conditioning.

Used To Ripen Bananas

The field for air conditioning, already large, is constantly expanding. Ships sailing in southern waters especially have installations. Although the layman immediately thinks of air conditioning as a cooling problem, the same principles of humidifying heated air are applicable. Air conditioning, especially as to its moisture control features in conjunction with temperature control, is used in ripening tropical fruits, notably bananas, a large plant recently being completed at Boston by a subsidiary of the United Fruit Co. Such installations are also being made on fruit carrying ships.

One of the most promising fields for expansion is in railroad transportation. Crack trains have such installations which have proved successful in attracting additional patronage to those trains.

However, there is a tendency among the railroads to work toward the goal collectively. One southwestern railroad, anxious to install air conditioning in 100 passenger cars, was prevailed to delay by an adjacent and connecting line which was in no position to proceed. The railroads, however, are generally thoroughly sold on air conditioning and in this field great expansion is expected with the turn toward better business conditions.

One of the largest air conditioning projects is that in the broadcasting building in the Rockefeller Center development at New York. Miles of galvanized steel ducts are being installed by the Carrier Engineering Corp., 500 tons of sheets being required for this building alone. The theaters have extensive installations.

Each patron of the two theaters under construction in Rockefeller Center will be allotted 40 cubic feet of conditioned air a minute. On the hottest day in summer, the theater temperature will be reduced sufficiently below the temperature out of doors to promote comfort without over-refrigeration, and the humidity will be maintained within a range of from 40 to 55 per cent.

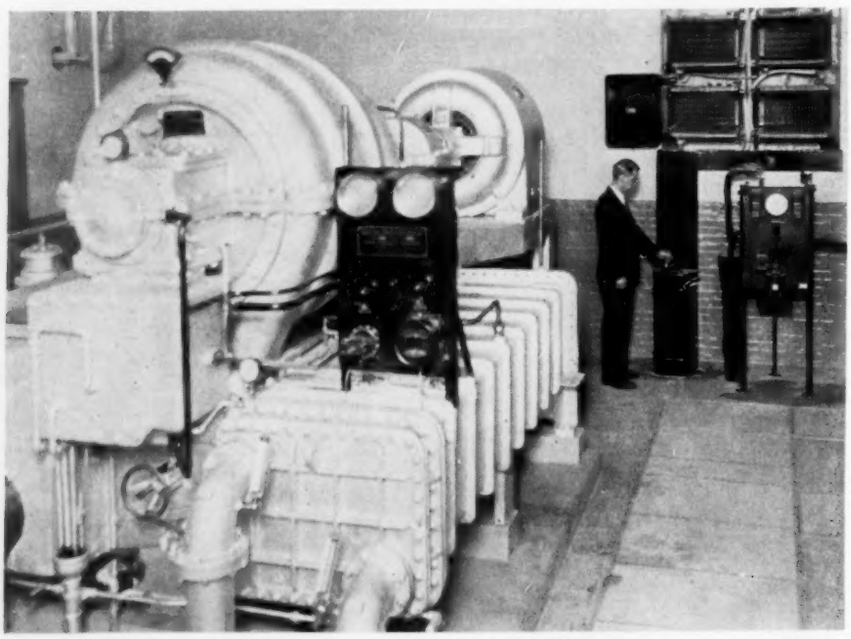
Weather Made to Order

Throughout this past year, the "weather" in the theaters will be made to order and will conform with the ideal climatic conditions as established by the Harvard school of public health and the American Society of Heating and Ventilating Engineers. Thermostatic and hygrostatic controls will operate automatically to maintain atmospheric conditions within the so-called "comfort zone." Every cubic foot of air going into the theaters will first be filtered and washed. The air conditioning engineers state that it will attain better than 96 per cent freedom from dust, dirt and other molecular organisms.

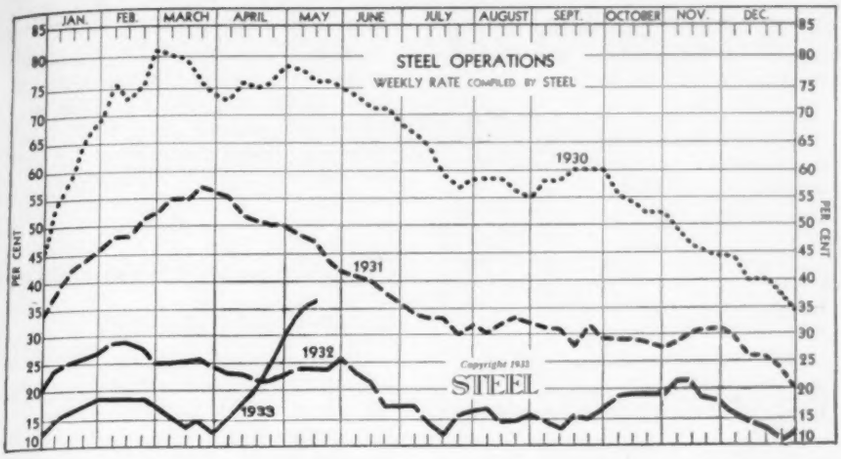
The larger of the theaters, known as the international music hall, will seat more than 6000 persons and will use nine tons of conditioned air per minute. This is equivalent to 241,890 cubic feet, or 40 cubic feet of air a person. Normal requirements are 30 cubic feet a person. Three huge centrifugal refrigerating machines—the latest scientific development in refrigeration—with a capacity of 600 tons of melting ice per 24 hours, will form the basis of the weather making system. In terms of ice poundage, they represent the summer day requirements of a city of 150,000 people. Other equipment includes three huge air conditioning machines in which the air is washed and its temperature and humidity fixed.

The sound motion picture theater in the south block will have a seating capacity of 3500, and will be supplied

(*Please turn to Page* 54)



HEART OF A CENTRIFUGAL REFRIGERATION UNIT: This mechanism cools water for the air-conditioning system in use for the senate and house of representatives, Washington. Without this, in the sultry summers of Washington, congress would need no second invitation to "go home"



Steel Rate Reaches 36, with Further Advance This Week

EXPANDING 3 more points, steelmaking operations went to 36 per cent in the week ended May 13, a new high since June, 1931. Continuation of the advance for another month would enable the 1933 rate, as charted above, to cross the 1931 line.

Except Detroit and Buffalo, which remain unchanged at 38 per cent, all major districts showed improvement last week. In finishing departments the betterment was even greater than in raw steel because inventories of semifinished material are being used. Tin plate mills are averaging 60 per cent.

Wheeling was the highest operating district at 65 per cent. In order came Cleveland at 54, Youngstown at 43, Buffalo and Detroit at 38, Chicago at 31, Pittsburgh at 24, Birmingham at 20 and Philadelphia at 16½.

Chicago

Steel ingot production last week averaged 31 per cent, an increase of more than 1 point. Indications are this rate at least will be maintained this week. Blast furnace operations are at a new high level since December, blowing in of one stack by the Illinois Steel Co. bringing active steelworks to seven out of 36. Finishing mill operations are well maintained, headed by sheets and tin plate.

Cleveland

Steel production here, including the Lorain district, advanced 6 points to 54 per cent last week, without exhausting the momentum. Corrigan, McKinney Steel Co. increased the number of its open hearths from eight to nine for the entire week, and started a tenth, the full effects of which will not be felt until this week. Otis Steel Co. dropped one unit. Of the 39 open hearths in the Greater Cleveland district, 22 were operating May 13.

Wheeling

With 24 out of 33 open-hearth furnaces on, steelworks operations in this district are at 65 per cent, an advance of four points.

Pittsburgh

Steel ingot operations advanced 2 points last week to 24 per cent. This is the average of ingot operations in six plants in this immediate district. At the best rate of the year, blast furnaces number 9 out of 53 belonging to steelworks here, to be increased to ten shortly when a Corporation stack blows in. Finishing mill operations show tin plate leading at 60 per cent, up 5 points, with sheets higher at 35, and bars and strip strong at 30. For this week, ingot operations likely will expand a point to 25 per cent and prospects for an even higher rate are favorable. This is because the local rail mill is expected to resume soon, at least within the month, and some important releases on structural work are also expected.

Youngstown

With 36 out of 83 open-hearth furnaces active, the Youngstown district steel rate has advanced 10 points to 43 per cent. There is no diminution in demand, especially for flat-rolled products from the automotive industry, which is chiefly responsible for the present brisk operating situation.

Birmingham

Open-hearth operations increased from 14 per cent to 20 in the week ended May 13, with every prospect that the rate will go higher before it goes lower.

Eastern Pennsylvania

An advance of 1 point put the eastern Pennsylvania steel rate up to 16-17 per cent. One mill has added an open hearth after a suspension of almost two months. Slightly longer weekly working schedules are observed at some plants.

Buffalo

District operations will continue at 38 per cent this week, with 14 open hearths on, the same as last week. Operations should continue at or near this rate throughout May.

Operating Rate of the Steel Industry, by Weeks

All figures except the monthly open-hearth and bessemer ingot totals of American Iron and Steel institute are percentages. Estimates are based upon weekly reports from the Pittsburgh, Chicago, Youngstown, eastern Pennsylvania, Cleveland, Birmingham, Ala., and Buffalo districts, which are weighted. Weeks end Saturday.

1932	1st Week	2nd Week	3rd Week	4th Week	5th Week	Steel's Average	Institute's Monthly Total tons	Institute's Monthly Average
Jan.....	22	25	26	27	28.5	25.7	1,454,309	25.86
Feb.....	28.5	27	25	25	....	26.4	1,450,648	26.83
March....	25	25.5	24.5	23	....	24.5	1,403,723	24.04
April.....	23	22	22	23	24	22.8	1,233,603	21.94
May.....	24	24	25.5	23	....	24.1	1,101,994	19.60
June.....	21	17	17	17	....	18.0	893,899	15.90
July.....	14.5	12	15.5	16.5	16.5	15.0	790,055	14.61
Aug.....	14.5	14.5	15.5	14.5	....	14.7	829,236	14.20
Sept.....	13.5	15.5	15	17	....	15.3	971,365	17.28
Oct.....	18	19	19.5	19.5	19.5	19.1	1,064,598	18.93
Nov.....	21	21	19	17.5	....	19.6	1,010,894	17.98
Dec.....	16	15	14	12	13	14.0	843,244	15.00
1933								
Jan.....	15.5	17	18	19	....	17.4	1,008,867	17.85
Feb.....	19	19	19	17	....	18.5	1,064,490	20.40
March....	15	13.5	15	14	15.5	14.6	891,153	15.18
April.....	17.5	20.5	25	29	....	23.0	1,334,797	24.56
May.....	33	36	..	..	....	....	.....	....

Died:

JOHN McLEAN, 72, for 20 years general manager of the Oliver Iron Mining Co., Duluth, until he retired in 1928, May 4 at Hollywood, Calif.

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John F. Conrad, 59, head of the Conrad Cast Iron Foundry, Elizabeth, N. J., April 21.

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Michael F. Brennan, 39, Mid-Continent district manager for Bradford Motor Works, Bradford, Pa., April 17 at Tulsa, Okla.

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William C. McKinstry, 67, superintendent of sheet mills, Sharon Steel Hoop Co., Sharon, Pa., April 13.

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Alfred B. Duncan, 74, former president, Duncan Bros. Machine Co., Elizabeth, N. J., at Riverside, Calif., April 25.

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Arnold E. Foster, president, All-American Steel Co., San Francisco, and former vice president of Bethlehem Shipbuilding Corp., April 22.

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Harry C. Moll, manager of the Honolulu, T. H., office of the Koppel Industrial Car & Equipment Co., Koppel, Pa., and a former resident of Beaver Falls, Pa., at Honolulu, May 6, in an automobile accident.

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Dr. Henry S. Munroe, 83, geologist and mining engineer, former consulting engineer for the bureau of mines and former president of the Mining and Metallurgical Society of America, at Litchfield, Conn., May 4.

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William J. Perkins, 49, president, Perkins Machinery Co., Milwaukee, May 2. He was born in Norway, Mich., and was long identified with copper mining, going to Milwaukee in 1927 to establish his own plant to build mining machinery of his own design.

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Ralph H. Tate, 50, vice president of Colbert Tate & Co., Pittsburgh, sales representatives, at Pittsburgh, May 5. He is a former vice president of the Ft. Pitt Spring Co., Pittsburgh, a member of the Duquesne club, Pittsburgh, and several New York clubs.

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Edward L. Sturgis, 76, prominent foundryman of Medina, N. Y., May 6. He organized the Medina Iron & Brass Co., Medina, the Buddington Foundry Co., Albion, N. Y., was general manager of the Bignall Co., the former Central Foundry Co. in Medina for many years and supervised construction of the Miller & Son Foundry in Utica, N. Y., and the Oil City Pipe Works in Medina.

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Lee I. Niedringhaus, 52, of Pacific, Mo., a former St. Louisan and sales manager of Granite City Steel Co., at St. Louis, May 11. Mr. Niedringhaus was the son of the late William F. Niedringhaus, founder of Granite City and its two leading industries, National Enameling & Stamping Co. and Granite City Steel Co.

Unfilled Tonnage Moves up; Increase Is 1.27 Per Cent

Unfilled tonnage of the United States Steel Corp. as of April 30 was 1,864,754, an increase of 23,572 tons from the 1,841,002 tons on books as of March 31, or 1.27 per cent. This is the first gain since August, September and October, 1932, when the successive upward steps were less than 1 per cent each. Not since March 31, 1931, has there been a larger increase, when it was 30,136 tons.

Fluctuations in tonnage on books have been within a narrow range since the end of June, 1932, between 1,800,000 and 2,000,000 tons. A larger forward movement is probable at the end of May as figures then will include the 144,128 tons booked this month for the San Francisco-Oakland bridge.

Sheet Sales and Output Reduced in March

Production of steel sheets in March dropped to a daily average of 2088 tons from 3275 net tons in February, according to current report from the National Association of Flat Rolled Steel Manufacturers, Pittsburgh. Sales averaged 2687 tons, compared with 2876 tons in February; and shipments, 2415 tons, against 2599 tons, these figures reflecting the shrinkage due to bank holidays.

Sales for March totaled 83,295 tons; production, 64,724 tons; and shipments, 74,880 tons. Unfilled tonnage as of April 1 amounted to 91,993 tons, compared with 83,760 tons March 1. Total sheet capacity in the United States for March was approximately 550,000 tons, and the capacity on which the association's figures are based was 330,000 tons.

National Doubling Profit

An official of the National Steel Corp., Pittsburgh, states he will be disappointed if second quarter earnings are not more than double those of the first quarter, when the profit was $280,844, equal to 13 cents a share.

National Steel's sheet and strip divisions at Detroit and tin plate division at Weirton, W. Va., have been operating especially high. E. T. Weir, chairman, states that orders for steel are coming from a wide range of buyers.

Census Shows Construction Is Six-Billion Industry

Construction in the United States is a $5,778,000,000 industry, according to the first national census of the contracting group of the industry, conducted by the census bureau at Washington. This sum is the aggregate business reported by 144,396 construction establishments for a recent but unstated year.

The combined cost of wages and materials entering into actual construction work was found to be $4,246,000,000, of which 42 per cent represented labor and 58 per cent materials. Structural and reinforcing steel, cement, sand and other aggregates accounted for 30 per cent of the total cost of all materials, lumber and mill work together taking more than 10 per cent and brick and stone combined about 7 per cent.

Receiver for Pressed Steel

Pressed Steel Car Co., New York, with plants at Pittsburgh and Hegewisch, Ill., was definitely placed in receivers' hands May 10 following an equity suit filed Jan. 6 by W. P. Southwell, New York, bondholder. Frank N. Hoffstot, New York, and Attorney George D. Wick, Pittsburgh, were appointed receivers at joint bond of $50,000.

Improves Detroit Plants

National Steel Corp., Pittsburgh, is proceeding with a program of construction of new plant facilities at its Detroit divisions. A new slag plant will be built and the two Hanna Furnace Corp. blast furnaces on Zug island, Detroit, are to be relined. In addition, rehabilitation work is to be done at the Michigan steel division of the Great Lakes Steel Corp. at Ecorse, Mich.

Wins Bridge Contract

George D. Recher, a student at the Atelier Adams-Nelson, Chicago, won first prize in the 1933 annual brige design competition of the American Institute of Steel Construction, New York. The problem was to design a steel highway bridge crossing a deep gorge with precipitous rock walls. W. A. Smith, University of Alberta, Canada, won second prize.

Industrial Men in the Day's News

H. H. Moss, Winner of Samuel Wylie Miller Medal

AS engineer for the Linde Air Products Co. he has met and mastered many practical problems in oxyacetylene welding.

HE is honored for his achievements in the application of fusion welding and flame cutting.

IN 1931 he assisted President Hoover's home conference. He is active in many societies, especially the American Welding society.

H. H. MOSS, awarded the Samuel Wylie Miller medal by the American Welding society "for his achievement in the application of fusion welding and oxyacetylene flame cutting," is an engineer in the service of the Linde Air Products Co., New York. In the course of his work he has been engaged in a variety of problems on the use of oxyacetylene welding and cutting in structural work, oil and natural gas transmission projects and transportation equipment, particularly freight cars and shipping containers.

In 1931 his aid to the committee on technological developments under President Hoover's Conference on Home Building and Home Ownership in connection with the use of welding in present and future small house construction culminated in a presentation of the subject before the conference.

More recently Mr. Moss has been giving careful study to advanced developments in oxyacetylene cutting, particularly in the field of flame machining, in which process an oxyacetylene flame is used for cutting, boring and shaping metal parts in a way similar to the machine tool operations used for fabricating metal parts up to this time. The preliminary results of the investigations in flame machining were presented in a paper read before the Welding society at its 1932 fall convention in Buffalo.

Mr. Moss has been active in the affairs of the Welding society, American Bureau of Welding, and the International Acetylene association. He is also an active member in affairs of the American Society of Mechanical Engineers.

The Samuel Wylie Miller medal is given annually to the individual who, in the opinion of the Welding society, has contributed most during the year past toward the advancement of welding. The annual award of the Miller medal was founded in 1927 by the late Samuel Wylie Miller, himself an outstanding figure in the development of welding.

ERSKINE RAMSAY was re-elected chairman of the board and Horace Hammond president at the annual meeting of the directors of the Alabama By-Products Corp., Birmingham, Ala.

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Col. Merrill G. Baker, until recently president of the Union Steel Casting Co., Pittsburgh, was appointed executive vice president of the Steel Founders' Society of America Inc., New York, instead of president as noted in the May 8 issue of STEEL. T. H. Harvey, Ohio Steel Foundry Co., Lima, O., continues as president, and Raymond L. Collier remains managing director.

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F. A. Marsh, southwestern field representative, National Tube Co., Pittsburgh, has moved his operating headquarters from Tyler, Tex., to Houston, Tex.

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Joseph E. Otis Jr., vice president and general manager of the Alemite Corp., Chicago, has been elected to the same position with the Stewart-Warner Corp. and its subsidiaries, which include the Alemite Corp. F. A. Hiter, general sales manager of the Alemite Corp., has been appointed to the same position with the Stewart-Warner Corp. and its subsidiaries.

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Earl C. Carr, general superintendent of the Federal Foundry Co., Indianapolis, has been appointed general manager, succeeding H. M. Molder, who retired April 1. Mr. Carr has been connected with the Federal foundry since it was organized in 1914. Previous to that time he was identified with the Best Foundry Co., of Bedford, O., a branch of the same company, for 5 years.

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L. S. Hamaker, sales promotion manager, Republic Steel Corp., Youngstown, O., addressed the industrial advertisers group of the New York Advertising club, May 5, on "Advertising in Overalls." The meeting was the best attended of any held by this group this year. Copies of this address may be had by application to the readers' service department of STEEL, Cleveland.

DETROIT

FOR some months it has been said in Detroit that when Henry Ford again spent money for publicity, the end of the depression would be in sight. This portent having occurred on May 11, the improvement in automobile production which originated immediately afer the banking holiday is now stamped as genuine.

This first Ford advertisement in a year came none too soon, however, as the momentum of production derived solely from the energy of dealers and the good will of the name was rapidly being exhausted. Last week assemblies at Fordson eased off from about 2500 units daily, 5 days a week, to barely 2000.

This followed the holdup of releases of some material noted a week ago. There continue to be evidences of a major change in policy at Fordson, and reports of the virtual breakup of that plant persist. Ford also appears to be concentrating purchases of materials and parts among fewer suppliers.

Production Trend Strong

Chevrolet, meanwhile, has pulled farther into the lead, and its present gait indicates a May production exceeding 65,000 units, or some 6000 more than in April. Dealers' stocks are depleted, and there are yet no signs of a diminution of retail demand, after which production would continue strong for a week or more building up stocks.

Pontiac may top 10,000 units for the first time in its history this month, further intrenching itself as the second General Motors line in point of volume, after Chevrolet. Beginning June 1 Pontiacs will be assembled at the Chevrolet branch at Tarrytown, N. Y.

Plymouth is rushing production at a rate that will run the May total well past 25,000 units and not far from 30,000. This unit of Chrysler is considerably behind orders for some models, a delay of 5 weeks occuring in delivery of a sport coupe requiring a special paint job.

Chrysler, meanwhile, is unflagging in its research. The recovery of business may mean that the time for the extremely low-price, economical car is past for the time being, but Chrysler is said to have a 2-cylinder engine which, mounted on floating power, does wonders. Progress is also reported on a complete redesign of the interior of an engine.

One design of an internal combustion engine that has practically passed out of the picture in the United States is the Knight. There was a time when Stearns, Willys, Moline and Root & Vandervoort pushed this type, but with only Willys offering it and as an option at $100 extra, it may be considered out of production. Several years ago Continental did some preliminary work on a single sleeve engine. Incidentally, Fred Rockelman, who left Plymouth to go with Continental, has resigned.

It is possible that Auburn may celebrate the opening of the Century of Progress exposition at Chicago with something as radical as its revolutionary change in body design several years ago. As has been stated here before, Auburn engineers have been working on 4-wheel drive.

Hudson-Essex has formally announced the new Terraplane six on a 113-inch wheelbase, 7 inches longer than the standard six. Unitsteel construction of body and chassis is featured, as in other Terraplanes. The base price of the special series is $505, which makes it intermediate between the standard six at $425 and the eight at $565.

Chrysler Hints Advance

From the manner in which Buick is placing its requirements for June some credence is lent to the recent report that its production may be shifted from Flint to another General Motors plant, Cadillac in Detroit being named. There are indications of cleaning up the program at Flint.

The price situation in automobiles warrants close watching. Chrysler last week advised dealers that a $50 rise within a month is possible. A few days ago General Motors advanced prices in Canada $5 to $25.

The campaign to force the use of alcohol as a blend for motor fuel as part of the federal farm relief program is at its peak, with a rider to the federal gasoline tax providing double the tax for straight gasoline. The Keystone Steel & Wire Co., Peoria, Ill., has been active in promoting the use of alcohol as a means of utilizing surplus agricultural crops, claiming to find a 10 per cent blend efficient.

By being first to market a car without a gearshift lever, Reo strengthens the tradition that the

Like the Canadian Mounties, He Always Gets His Way

THEY tell this story in Detroit on the production manager of an automobile plant, who does not deny that he is "hard" (some say he was quarried, not born) because the large force under him requires unwavering control.

It was decided to lay a switch track between two building, necessitating the removal of a yard foreman's shanty. Passing the shanty late in the afternoon, the production manager advised the foreman of the change and instructed him to remove his desk before leaving.

For some reason or other, the foreman was distracted and forgot the order. But not the production manager. When the foreman arrived the next morning his desk was in its place but out in the open, as the walls and roof of the shanty had been carefully and completely removed!

smaller units do the pioneering in the automobile industry.

Hupp, which in 1909 introduced the unit power plant with transmission and clutch integral with the engine, also claims parentage of the long stroke engine, hotchkiss drive, hot-spot intake manifold, chrome-nickel cylinder blocks, eight-in-line engine, crankcase ventilation, engine oil cooling, and one-piece tubular front axle.

Rickenbacker led with 4-wheel brakes. Mitchell and Franklin over a decade ago had sloping or snow-plow-type radiator shells, while Franklin featured a divided windshield. Auburn broke away from orthodox body design about five years ago. Graham was first with fender valances.

Hudson-Essex not only brought out the first popular-price closed cars—its former coach models—but also was in the van by several years with dash starting. Of all cars ever built, the former Wills Ste. Clair probably was the most advanced for its time; being too advanced, in fact.

Starter on Cadillac First

General Motors' major contribution has been the self-starter, although this was pioneered by Cadillac when the latter still was an "independent." Chrysler's floating power unquestionably is its leading development. Hupp, however, maintains that its 1928 line was the first to have full rubber engine mounting.

Size undoubtedly leads to conservatism, and smaller manufacturers of necessity often stake their existence on a radical departure, whereas the responsibility of the larger units to their stockholders makes slow progress desirable. Nor is the memory of the automobile public such that pioneering for its own sake is long remembered.

Chrysler and General Motors, incidentally, both have been experimenting with a transmission minus the gearshift lever. Earlier this year it was said that Buick in 1934 would be a leverless car.

It is possible that Chevrolet, at the General Motors' Century of Progress exhibit at Chicago, may permit a buyer to choose his model and then see it assembled before his eyes. . . . "Metals of a Motorcar," a film based upon research by J. M. Watson, metallurgical engineer of the Hupp Motor Car Corp., and approved by the bureau of mines, will be shown at the exposition. . . . Marmon has followed Willys-Overland and Studebaker into receivership. Incidentally, A. R. Erskine, of Studebaker, who became chairman of White Motors after the merger with Studebaker, has left the White setup, which is another step toward separation of the two.

April Ingots up 61 Per Cent; Rate Highest in 14 Months

STEEL ingot production in April was at the highest rate in 14 months, at 24.56 per cent of capacity, exceeding that of every month since February, 1932, when the rate was 26.83 per cent of capacity, according to compilations of the American Iron and Steel institute. The daily rate was 53,392 tons in April, compared with 33,006 tons in March, 1933, the rate for that month being 15.18 per cent. The increase in tonnage in April over March was 61.76 per cent.

In the accompanying table the Institute has revised its figures for January, February and March to conform to the new basis of capacity, which is 67,386,130 gross tons as of Dec. 31, 1932, for bessemer and open-hearth ingots, compared with capacity of 67,473,630 gross tons as of Dec. 31, 1931, the previous base. Daily output and per cent of operation for these months is slightly altered by this new base.

Average rate of operation over four months of 1933 is 19.39 per cent, compared with 24.64 per cent for four months of 1932. Average daily production for the first four months of 1933 is 42,150 gross tons, compared with a daily average output of 53,291 gross tons for the corresponding period of 1932.

Calculated output of bessemer and open-hearth ingots for April was 1,334,797 gross tons, compared with 891,153 gross tons in March, 1933, and 1,233,603 gross tons in April, 1932.

Details of the new capacity figures by the Institute were presented in STEEL in the issue of April 24, page 16.

Railroads' Steel Purchases $92,030,000 in 1932

Class 1 railroads in 1932 purchased iron and steel products costing $92,030,000, compared with $213,500,000 in 1931 and $437,840,000 in 1929, according to *Railway Purchases and Stores*. The 1932 purchases included steel rails $15,200,000; wheels, axles and tires, $18,990,000; frogs, switches, crossings, track fastenings and bolts, spikes, tie plates, rail anchors, etc., $14,100,000; iron bridges, turn tables, structural steel, bar iron and steel, forgings, fabricated and unfabricated, etc., $7,830,000; flues and tubes for locomotives and stationary boilers, $1,600,000; telegraph and telephone, interlocking and signal material, $5,170,000; bolts, nuts, washers, rivets, springs, etc., $4,610,000; locomotive and car castings, beams, couplers, frames and car roofs, $16,800,000; machinery, boilers, repair parts and all other iron and steel products, $7,730,000.

Steel Ingot Production — 1932-33

95.68 Per Cent of Industry Reporting

Gross Tons

1932	Open-hearth	Bessemer	Monthly output companies reporting	Calculated monthly output all companies	No. of working days	Approximate daily output all companies	Per cent operation
Jan.	1,230,907	160,633	1,391,540	1,454,309	26	55,935	25.86
Feb.	1,230,970	157,067	1,388,037	1,450,648	25	58,026	26.83
Mar.	1,149,193	193,944	1,343,137	1,403,723	27	51,990	24.04
Apr.	1,036,163	144,197	1,180,360	1,233,603	26	47,446	21.94
4 Mo.	4,647,233	655,841	5,303,074	5,542,285	104	53,291	24.64
May	950,838	103,593	1,054,431	1,101,994	26	42,384	19.60
June	755,068	100,249	855,317	893,889	26	34,381	15.90
July	653,039	102,916	755,955	790,055	25	31,602	14.61
Aug.	696,122	97,323	793,445	829,236	27	30,712	14.20
Sept.	804,470	124,970	929,440	971,365	26	37,360	17.28
Oct.	885,773	132,876	1,018,649	1,064,598	26	40,946	18.93
Nov.	838,413	128,844	967,263	1,010,894	26	38,881	17.98
Dec.	724,917	81,932	806,849	843,244	26	32,432	15.00
Total	10,955,879	1,528,544	12,484,423	13,047,568	312	41,819	19.34
	97.88 Per Cent of Industry Reporting						
Jan.	885,743	109,000	994,743	1,008,867	26	38,803	17.35
Feb.	922,806	126,781	1,049,587	1,064,490	24	44,354	20.40
Mar.	784,168	94,509	878,677	891,153	27	33,006	15.18
Apr.	1,180,893	135,217	1,316,110	1,334,797	25	53,392	24.56
4 Mo.	3,773,610	465,507	4,239,117	4,299,307	102	42,150	19.39

Figures exclude crucible and electric ingots. Operating percentages for 1932 are based on 67,473,630 tons annual capacity as of Dec. 31, 1931; for 1933, on 67,386,130 gross tons annual capacity as of Dec. 31, 1932.

EDITORIAL

Steel Lags in Preparation for Partnership with U. S.

PRESIDENT ROOSEVELT'S radio talk to the public on Sunday, May 7, contained several references to industry which strike at the very heart of the problem of unfair competition. He gave wide publicity to a practice that has caused the unnecessary loss of hundreds of millions of dollars throughout the last four years and even now is seriously retarding the recovery of business.

He stated the case in these words:

> "Take the cotton goods industry. It is probably true that 90 per cent of the manufacturers would agree to eliminate starvation wages, . . . long hours of employment, . . . child labor, would agree to prevent an overproduction that would result in unsaleable surpluses.
>
> "But, what good is such an agreement if the other 10 per cent of cotton manufacturers pay starvation wages, require long hours, employ children . . . and turn out burdensome surpluses?
>
> "The unfair 10 per cent could produce goods so cheaply that the fair 90 per cent would be compelled to meet the unfair conditions. Here is where the government comes in. Government ought to have the right and will have the right, after surveying and planning for an industry, to prevent, with the assistance of the overwhelming majority of that industry, unfair practice and to enforce this agreement by the authority of government."

Destructive Influence of "Unfair" Minority Is Well Known in Steel Industry

The President chose the cotton goods industry for his example, but with some modifications he would have been equally justified in choosing the iron, steel and metalworking industries. True, these industries do not employ child labor; hours are not unduly long; in general the wages cannot be characterized as "starvation"; nor do "burdensome surpluses" present a major problem. But the iron, steel and metalworking industries, like the cotton goods industry, are cursed with the practice of a minority which is just as destructive as the tactics of the "unfair 10 per cent" among cotton goods manufacturers.

In the steel and allied industries the principal source of difficulty is the existence of more capacity than could be utilized profitably under the condition of reduced demand which has prekeep plant and equipment in operation, management has taken business at prices which permit of no profit—prices which in the great majority of cases have caused staggering losses and precipitated the industry into new cycles of price-cutting.

Conscientious executives in the industry have done everything possible within reason and within the limits of their authority to discourage ruthless price-cutting. Their efforts have been of little avail, because no force, other than moral suasion, is available for preventing unfair tactics on the part of the destructive minority. In other words, self-government in the steel industry has failed.

Therefore, while many of us may regret the necessity of seeking outside assistance, it seems that the only recourse left is to join hands with the government to the end that the will of the "90 per cent" be enforced upon the "unfair 10 per cent."

Industry Will Welcome Partnership with Government as Final Bid for Sanity

On this basis, the majority of industrial executives will welcome the "partnership" between government and industry proposed by the President. Unfortunately, it seems to be the only way left by which the evils of ruthless competition can be cured.

Even with government assistance, the task will be difficult. The steel industry will be obliged to muster its full strength in order to carry its share of responsibility in the new partnership.

Now, while the steel industry rests complacently after having sent Mr. Lamont to Washington to protest against the 30-hour bill, the representatives of other industries are camped in the capital city, prepared to meet the government more than half-way in the new program. The steel industry is notoriously inept in dealing with public relations. It has been slow to accept responsibility, sluggish in recognizing opportunities and neglectful in mobilizing its great potential strength for effective, collective action.

Here is an opportunity to turn over a new leaf. The first step is to place competent representatives in Washington, vested with authority to work with the government in planning for the new partnership. Here is a definite challenge to leadership in the steel industry! Quick and intelligent action is essential.

THE BUSINESS TREND

Statistics Begin To Reflect Business Improvement

IMPROVEMENT in industrial activity is lifting many important barometers of business to levels higher than those of a year ago, In a few cases two-year records are being established.

Soft coal output was one of the first to rise above 1932 figures. In the week ending April 29, production forged ahead of the corresponding tonnage for 1932 for the fourth time since Jan. 1. Electric power consumption now exceeds that for the corresponding week of last year.

Car loadings, which gained 42,706 cars in the week ending April 29, may cross the 1932 line when the figures for the week ending May 6 are announced on Saturday, May 13. Preliminary reports from important railroads show both increases and decreases, indicating that the next total may be near to the 535,676 reported for the April 29 week. If this proves true the lines will cross, because the loadings for May 7, 1932 were only 533,677.

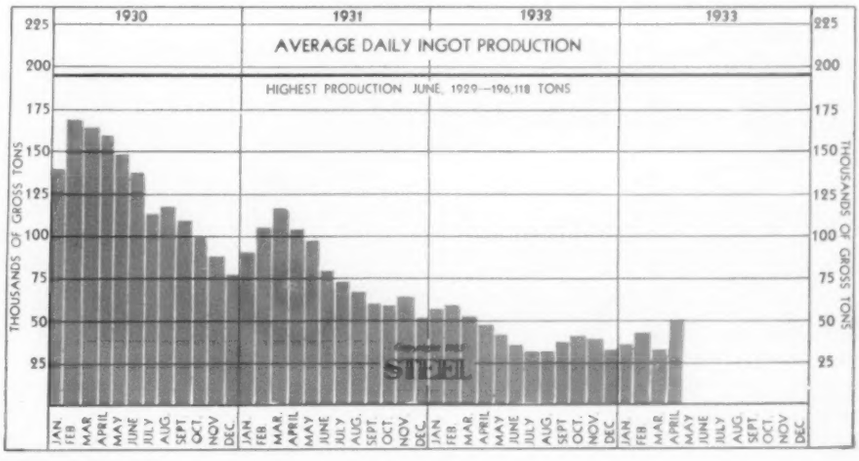
According to weekly estimates, the 1933 curve of steelworks operations crossed the 1932 line in the third week of April. The American Iron and Steel institute's computed average of steel ingot production for the month of April was 24.56 per cent of capacity. This is the highest monthly rate since February, 1932. Incidentally, while the average for April of STEEL's weekly estimates of the operating rate—23.0 per cent—was higher than that of other publications and services, it fell short of the institute's computed figure by 1½ points.

Unfilled tonnage of the United States Steel Corp. on April 30 was 1,864,574, a gain of 23,572 tons over the figure for March 31. This was the first gain reported since Oct. 31, 1932.

Industry Is Reassured by Favorable Tone of President Roosevelt's Radio Address

Alarm over the methods by which the government will effect supervision over industry has subsided. The more liberal tone of the modified plans and the President's straight-forward explanation of his objectives make it appear that a partnership of government and business, rather than a dictatorship over industry by government, is intended.

Business sentiment is responding enthusiastically to the cheerful reports of activity and to the more favorable character of news from Washington. However, restraint and caution still prevail. In spite of the remarkable improvement, we are not yet out of the woods.

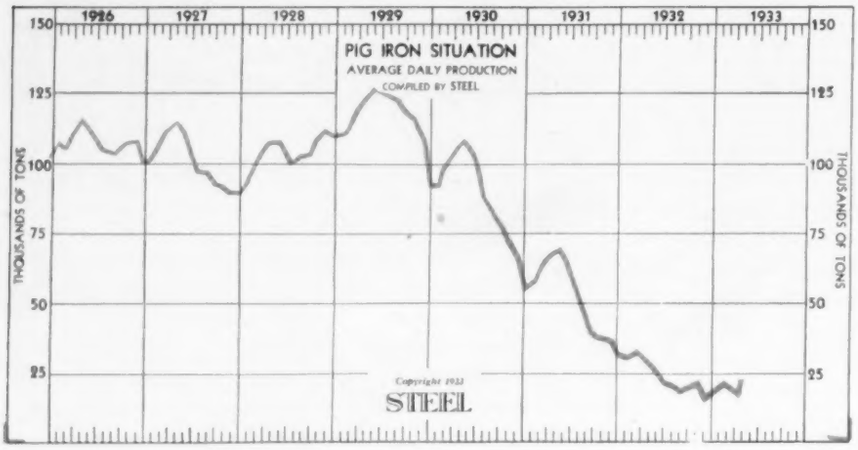


1933

April	53,392
March	32,812
Feb.	44,431
Jan	38,826

1932

April	47,446
March	51,990
Feb.	58,026
Jan.	55,935



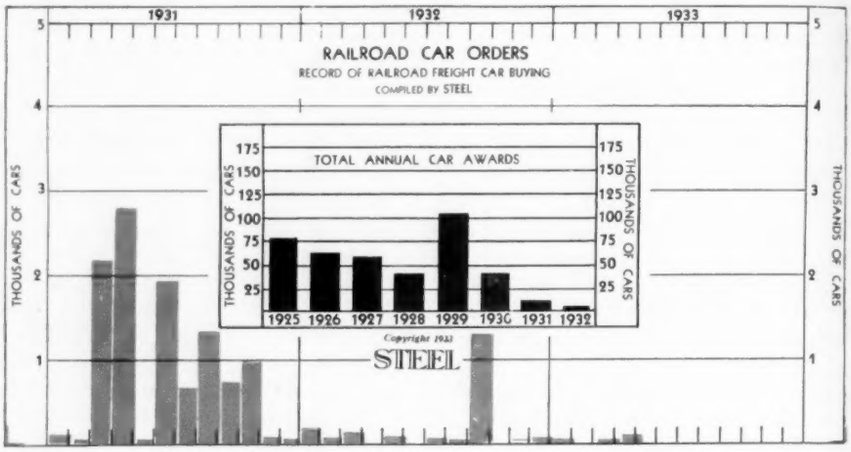
March, 1933	20,770
March, 1933	17,484
April, 1932	28,524

Pig Iron Production Up 18.8 Per Cent in April

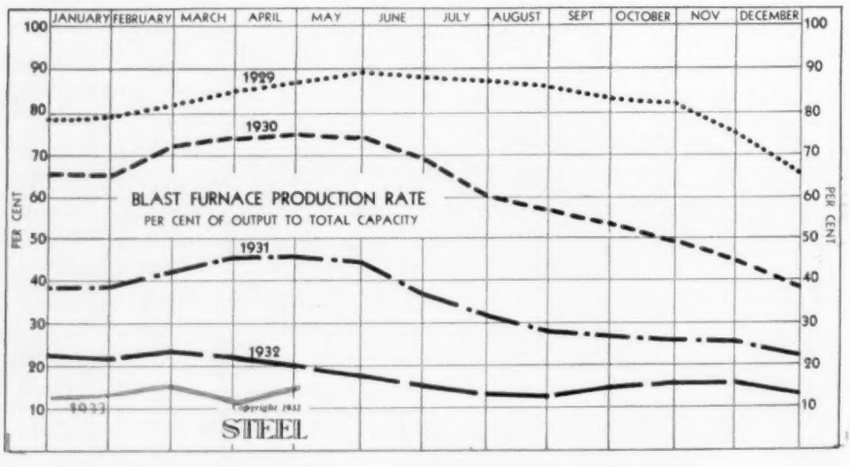
With an average daily production rate of 20,770 tons, coke pig iron in April reached the highest level since last November when the daily output stood at 20,858 tons. Compared with the March rate of 17,484 tons per day, the April figure was an increase of 3286 tons, or 18.8 per cent. Production in April, one year ago, was 28,524 tons, while two years ago the daily rate stood at 66,986 tons.

Freight Car Buying Remains at Low Ebb

There were awards for 50 domestic freight cars in April, and with the total for the four months aggregating only 58 cars, orders for railroad rolling stock remain at abnormally low levels. There were no orders for freight cars in April last year while for the same month in 1931 awards totaled 2798 cars. It is becoming increasingly evident that a sustained expansion in traffic volume would necessitate prompt replacement of much obsolete and worn out equipment.



April, 1933	50
March, 1933	5
April, 1932	0



April, 1933	15.1
March, 1933	12.7
April, 1932	20.2

Blast Furnace Activity Gains in April

The upturn in pig iron production during April resulted in an increase of 10 furnaces to the active list. Relating production to capacity, operations in April were 15.1 per cent, against 12.7 in March and 20.2 in April, 1932. The total of 48 active blast furnaces on April 30 was the highest since last November, with 51. Furnaces active on March 31 totaled 38 and 44 on Feb. 28.

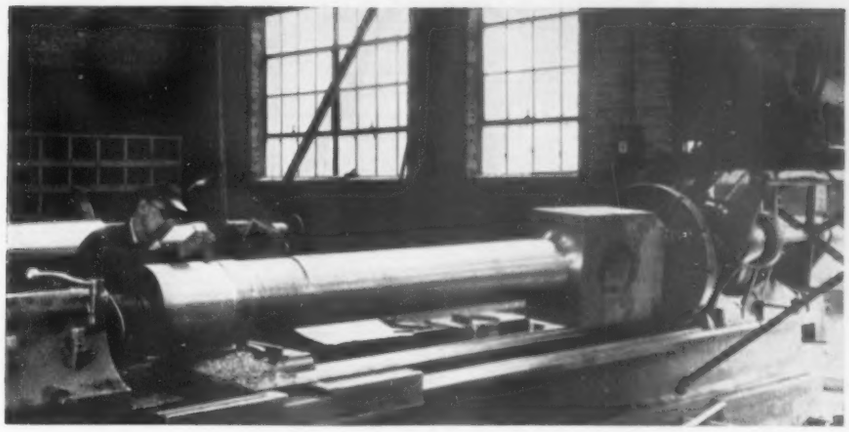


Fig. 1—Hydraulic press piston rod of nickel-chrome-molybdenum steel quenched and drawn. Its finished weight is 5360 pounds. The shaft is 13¼ inches diameter, the head is 27 x 24 x 16 inches long, and the length is 10 feet 3 inches

DEVELOPS NICKEL-CHROME-MOLYBDENUM STEELS FOR HEAVY-DUTY FORGINGS

Part I

DURING the past 15 years demand for large-section forgings of higher physical characteristics than are ordinarily expected from forgings made from the commoner types of alloy steels has grown rapidly. This demand has been brought about by the higher load factors and faster speeds applied to various types of machinery and structural work and to the increase in the size of the units designed.

Forgings of this type are needed in marine work; in the mining and oil fields; in the construction of locomotive parts, turbines and engines, bridges and buildings; in machine design; and in production equipment for the automotive and allied industries.

Starting with iron, the heavy section forging industry has progressed through the plain carbon steels to the simple alloy steels of nickel, chromium and vanadium or slightly more complex combinations of these alloys such as nickel-chromium and chromium-vanadium. Physical properties to be expected from these steels have been fairly well determined for sections grading from 4 up to 50 inches, a range of sizes which fairly well covers the greater portion of the heavier forging industry.

The insistent call for still higher properties in specialty parts, however, has lead the industry into special alloy steels. To supply this demand, the A. Finkl & Sons Co., Chicago, has experimented and developed a series of steels which can be produced commercially without high alloy additions.

In small sections, ½ to 2 inches, there is little dif-

BY M. R. CHASE

Chief Metallurgist, A. Finkl & Sons Co.

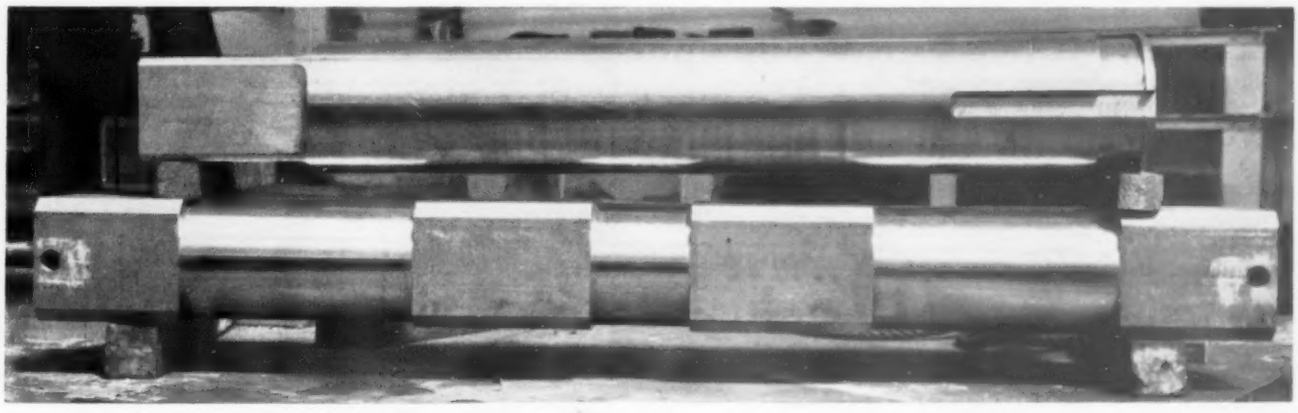


Fig. 2—Quenched and drawn nickel-chrome-molybdenum steel shafts for a power shovel used in mining. The rotating shaft, weighing 1765 pounds, is 11 inches diameter and 6 feet 5 inches long. The shipper shaft weighs 2100 pounds and is 10½ inches diameter and 8 feet 11 inches long

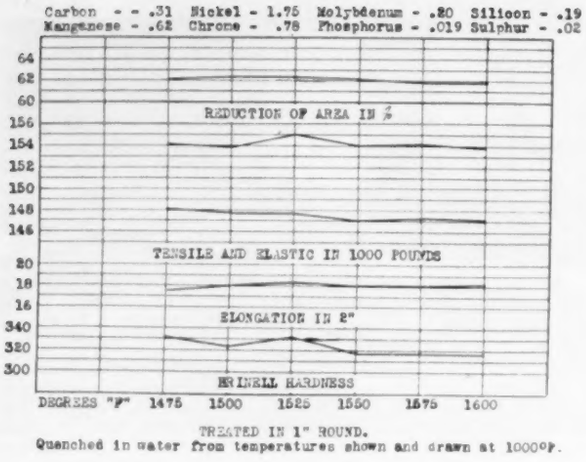

Carbon - - .31 Nickel - 1.75 Molybdenum - .20 Silicon - .19
Manganese - .62 Chrome - .78 Phosphorus - .019 Sulphur - .02
REDUCTION OF AREA IN %
TENSILE AND ELASTIC IN 1000 POUNDS
ELONGATION IN 2"
BRINELL HARDNESS
DEGREES "F" 1475 1500 1525 1550 1575 1600
TREATED IN 1" ROUND.
Quenched in water from temperatures shown and drawn at 1000°F.

FIG. 3—Chart showing physical properties of Type 1 nickel-chrome - molybdenum steel which hardens over a wide range without appreciable effect on the properties

ference in the properties which can be developed in the above mentioned steel. As the section increases, the effect of the various alloying elements becomes more apparent, especially in regard to depth hardening characteristics. These characteristics of the commoner alloys when used in heavy sections were not great enough to produce the higher results demanded, for physical properties decreased rapidly as the midway and central portions of the forgings were approached.

Depth Hardening Reached Limit

That is, the alloy steel forgings in the heavy section developed the same problem as the straight carbon steel forgings in the smaller sections but on a higher plane. As the section increased, the depth hardening property of the alloy reached its limit in the same manner as the carbon in the plain carbon steels reached its depth hardening limit. As a result, the forgings contained a tough, strong skin with a weaker interior. On the larger forgings this skin was not deep enough to make the average strength of the section great enough to meet the higher requirements when tested at a point midway between surface and center of the section. This condition could be offset somewhat on commoner types of alloy steels by using higher carbon and alloy additions, however, this usually resulted in increased manfacturing difficulties and costs. The finished product very often had the required strength, but it was not sufficiently ductile and contained an inherent brittleness. Consequently, the forgings did not give the service expected of them.

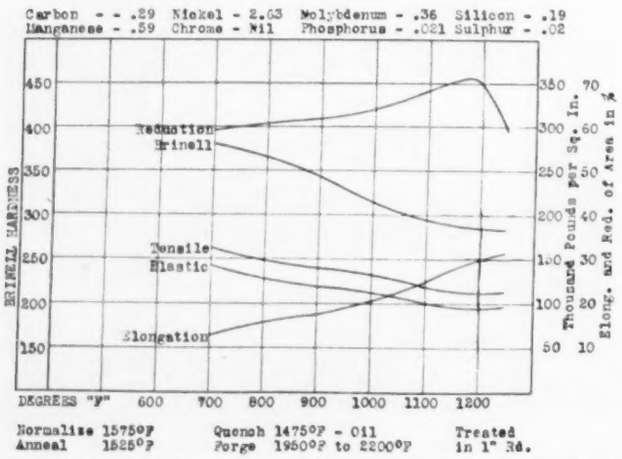
Within the last decade the element molybdenum became a commercial reality and tests indicated that when alloyed with steel it imparted desirable characteristics. Varying percentages of this element were added to the commercial chromium and nickel steels and it was found that small additions greatly magnified the effect of the nickel and chromium. Tests on large sections of chrome-molybdenum and nickel-molybdenum steels proved that increased depth hardening characteristics could be obtained and to a greater extent than by higher additions of chrome or nickel. Nickel-molybdenum and chrome-molybdenum showed greater possibilities than nickel, chrome, nickel-chrome and chrome-vanadium. With these two steels higher properties could be obtained on larger sections and, although this improvement was not great enough for the larger section, it was a step upwards.

Of the two steels, nickel-molybdenum and chrome-molybdenum, the nickel-molybdenum had the better depth hardening properties and was very ductile. Small amounts of molybdenum, 0.20 to 0.30 per cent, used in combination with from 1.00 to 5.00 per cent nickel greatly magnified the lowering of the A_r ranges and showed a desirable increase in the hysteresis of the transformation points. With proper adjustment of the carbon content, additions of from 0.15 to 1.00 per cent molybdenum to the commercial nickel steels produced air-hardening properties. Physical properties developed on one type of nickel-molybdenum steel are shown in Fig. 4. This steel, while not an air-hardening type, showed fairly good results in penetrative qualities.

Penetration Is Improved

Molybdenum in combination with chromium also showed a desired penetrative effect and the molybdenum greatly magnified the action of the chromium. Additions of 0.30 per cent molybdenum to a 1.00 per cent chromium steel gave about the same penetrative affect as a 2.00 per cent chrome steel. This steel was more ductile and easier to machine than the 2.00 per cent chrome steel.

In large sections, these two steels showed slightly different properties in reference to machinability and ductility, resistance to wear and abrasion, and to service temperature variables and temper brittleness. By combining these two steels into a nickel-chrome-molybdenum steel, an alloy was produced which gave desirable properties and excellent depth hardening properties in the large sections. Several grades of this steel were developed to meet individual needs and they have answered the purpose for which they were intended, having withstood actual operating tests over a period of 14 years.


Carbon - - .29 Nickel - 2.63 Molybdenum - .36 Silicon - .19
Manganese - .59 Chrome - Nil Phosphorus - .021 Sulphur - .02
Reduction
Brinell
Tensile
Elastic
Elongation
BRINELL HARDNESS
Thousand Pounds per Sq. In.
Elong. and Red. of Area in %
DEGREES "F" 600 700 800 900 1000 1100 1200
Normalize 1575°F
Anneal 1525°F
Quench 1475°F - Oil
Forge 1950°F to 2200°F
Treated in 1" Rd.

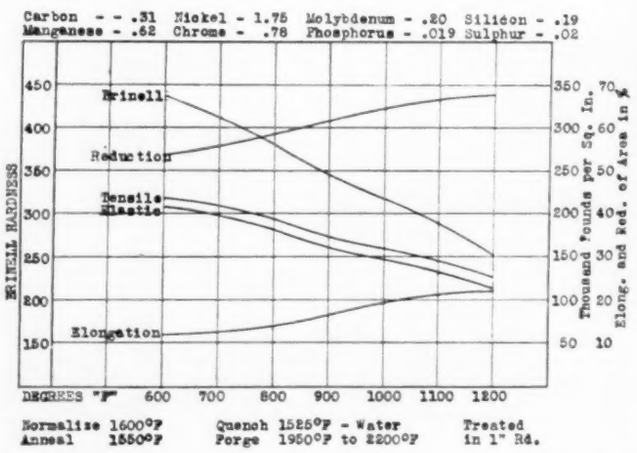

Carbon - - .31 Nickel - 1.75 Molybdenum - .20 Silicon - .19
Manganese - .62 Chrome - .78 Phosphorus - .019 Sulphur - .02
Brinell
Reduction
Tensile
Elastic
Elongation
BRINELL HARDNESS
Thousand Pounds per Sq. In.
Elong. and Red. of Area in %
DEGREES "F" 600 700 800 900 1000 1100 1200
Normalize 1600°F
Anneal 1550°F
Quench 1525°F - Water
Forge 1950°F to 2200°F
Treated in 1" Rd.

Fig. 4 (Left)—Physical properties of one type of nickel-chrome-molybdenum steel. Although not air hardening, this steel has good penetrative qualities. Fig. 5 (Right)—Physical properties developed on small sections of Type 1 nickel-chrome-molybdenum steel. Either oil or water quenching can be employed

These steels develop high properties in the large sections, harden uniformly through a wide range of temperature, withstand high drawing temperatures with little loss in strength and appear to be free from temper brittleness.

These nickel-chrome- molybdenum steels also are used extensively in the lighter sections due to the fact that there is a greater assurance of obtaining the desired properties than on the simpler alloy steels. In many ways they are easier to handle from a manufacturing standpoint and result in a saving to the user. It is evident that a steel which will give better properties in a large section will have a greater chance of giving more uniform properties in a small section.

Practically all of these steels fall within the following general chemical range: Carbon, 0.30-0.90; manganese, 0.30-0.90; nickel, 0.50-2.00; chromium, 0.25-1.10; molybdenum, 0.15-1.25; and silicon, 0.15-1.00 per cent. Within these ranges four general types as shown in Table I, are used extensively.

Oil or Water Quenching

Type 1 is used in medium and small sections, running from 1 to 13 inches in section. This steel hardens uniformly in small sections and fairly deeply in the larger sections of its range and produces a tough, strong core on the larger sections. It hardens over a wide range of temperatures without appreciably affecting the physical properties, as shown in Fig. 3. It can be either oil or water quenched in small sections. The physical properties developed on small sections are shown in Fig. 5. Water quenching is generally employed on the larger forgings such as are shown in Figs. 1 and 2.

This type of steel was developed for small and medium size forgings of a design which can be quenched and drawn. It was not designed to give higher properties in the normalized or normalized and drawn state. Tensile tests on commercial shafts, taken midway between the center and surface, gave the figures shown in Table II.

An example of the properties which can be obtained in larger sections is illustrated by the results obtained from a midway point in the hydraulic press rod shown in Fig. 1. Properties were as follows: Tensile strength, 114,000 pounds per square inch; yield point, 92,500 pounds per square inch; elongation in 2 inches, 19.0 per cent; and reduction of area, 52.0 per cent.

Type 1 steel is an excellent one for all forms of shafting, crankshafts, steam hammer piston rods, locomotive parts, axles, connecting rods, and the like. Field tests show that it stands up better than the commoner types of alloy steels on torsional stresses. It can be commercially machined at higher hardnesses and there is less distortion in heat treated parts after machining. For example, a 5-inch diameter shaft heat treated to 255 brinell before machining was machined and a keyway cut its entire length of 13 feet. Final checks on 15 of these bars showed that the keyway ran out of line only 0.004 to 0.010 inches. On other types of steels used for this purpose the keyways would twist from ¼ to ½ inch from end to end due to the release of surface strain in the steel when cutting the keyway.

(To Be Concluded)

Find New Copper Plating Process

A NEW and safe process for copper plating steel was announced at the sixty-third general meeting of the Electrochemical society in Montreal, May 11-13, by Dr. Colin G. Fink and C. Y. Wong of Columbia university, New York.

In only one minute, a satisfactory copper coating is obtained by employing the new method, according to Dr. Fink, head of the department of electro-chemistry at Columbia, who conducted the research jointly with Mr. Wong. Sodium sulphate, boric acid, and a complex copper salt, disodium diaquodioxalatocupriate, take the place of poisonous cynanide in the bath.

Safety, relative stability and economy are claimed as chief characteristics of the process, which, it is said, may be applied to large automatic plating installations where strip steel and standard steel parts are copper coated before subsequent coatings.

Experimental results showed that low current density made it possible to deposit a sufficient thickness of copper in less time with the new bath than with the cyanide bath. A low current density and a shorter plating period were found to be optimum working conditions for the new, or "oxalato," process.

"The precipitation of a basic salt," Dr. Fink concludes, "is not yet completely eliminated and requires further study. However, the slight deposit obtained does not interfere with the operation of the bath. A good, adherent copper deposit is obtained, forming a satisfactory basis for the acid copper bath to follow."

Builds Steel Trailer for Transporting Horses

A steel trailer, which will accommodate one or two race horses for transportation from one track to another and will insure a high degree of safety and roadability, has been perfected by Charles Meuller, wire mill master mechanic of the Colorado Fuel & Iron Co., Pueblo, Colo.

Just recently (STEEL, March 13, page 28), Mr. Meuller designed a new type of race track starting gate featuring steel construction.

The rear side of the new trailer can be lowered as a runway to prevent injury to a horse in loading or unloading. Angle bars produced by the Colorado Fuel & Iron Co. are used in constructing the vehicle, the floor of which is the only part made of wood.

The first trailer was completed last week and was shipped to Texas. Later it will be exhibited at El Paso, Juarez and Pacific Coast race tracks. It can be attached either to passenger automobiles or trucks, as may be desired.

Table I

Types of Nickel-Chrome-Molybdenum Steels

Type	Carbon, per cent	Manganese, per cent	Chromium, per cent	Nickel, per cent	Molybdenum, per cent	Silicon, per cent
1	0.30-0.35	0.55	0.75	1.50	0.25	0.25
2	0.35-0.45	0.55	0.75	1.50	0.25	0.25
3	0.50-0.60	0.55	0.75	1.50	0.30	0.25
4	0.50-0.60	0.55	0.80	1.50	0.75	0.25

Table II

Physical Properties of Type 1 Steel

Size, diameter in inches	Tensile Strength, pounds per square inch	Yield Point, pounds per square inch	Elongation in 2 Inches, per cent	Reduction of Area, per cent	Brinell Hardness
6	132,750	108,000	18.5	54.0	260
6	122,925	99,000	22.0	62.1	241
6	108,000	85,000	22.5	63.0	209
10	114,500	92,250	21.0	58.0	241
10	105,875	83,575	21.0	59.0	223

Gear Makers Air Industrial Ills, Study Technology

INTELLIGENT selling, fair buying, honesty in price setting, and quality workmanship and materials constitute the keystone of a sound gear business. This was forcefully portrayed in an industrial drama—"A Sales Bout"—presented before members of the American Gear Manufacturers association, meeting in Wilkinsburg, Pa., May 4-6.

Short dramatizations of this nature are becoming more popular among trade associations and serve to carry home important points in building impregnable business structures. Augmenting the histrionic efforts of the group of players, made up of members of the organization, the disastrous effects of price cutting were illustrated strikingly in later discussions devoted to merchandising.

The program for the meeting was well balanced and covered also the technical aspects of gear manufacture, standardization activity and routine business. New officers, remarks by re-elected president E. W. Miller, and new members were summarized in the May 8 issue of STEEL, p. 16. In addition to the new members listed at that time, the Synthane Corp., Oaks, Pa., also was received into the association. Incidentally, at the 1932 annual meeting of the association the constitution was amended to admit academic members and accordingly nine have become affiliated—faculty members of various colleges.

Standardization Progresses

From the report of the general standardization committee, members were given a comprehensive outline of standardization progress. Work of the committee has reached a stage where progress is slow compared to the amount of time expended. This is to be expected inasmuch as the general points were covered quickly and now it is the unacceptable factors which have slowed activity.

Specification sheets containing instruction for gear purchasers were accepted as a recommended practice, having been submitted by the library committee. This body also has taken preliminary steps in the compilation of an A. G. M. A. gear handbook. Prof. Earle Buckingham, Massachusetts Institute of Technology, Cambridge, Mass., already has prepared extensive data for the book.

Opening the program of technical papers was a review of the Bullard-Dunn process for descaling metals (STEEL, Nov. 6, 1930, p. 61) as applied to the cleaning of heat treated gears. Floyd T. Taylor, Bullard-Dunn division, Bullard Co., Bridgeport, Conn., presented the paper. Sulphuric acid forms the base of the descaling solution. Caustic soda and tri-sodium phosphate constitute the base of the baths used for degreasing or defilming. A feature of the process is that the descaling bath will operate continuously without the necessity of dumping. Thus is avoided the problem of acid disposal, with which both manufacturers and state water commissions must contend. Equipment employed to carry out the process is similar of that required for electroplating, current being supplied by standard 6-volt direct-current motor-generator sets. For small production hand served tanks can be used while for production on a large scale automatic chain conveyors are suitable.

Large Gears Described

Considerable interest was evidenced in the discussion on design and manufacture of large gears for industrial service, presented by Thomas Holloway, United Engineering & Foundry Co., Pittsburgh. To illustrate his address he referred to a large special drive for the roughing stands of a 96-inch continuous plate mill. Distance between the stands was established by the rolling schedules, and there was a problem as to whether each stand should be driven by individual motors or whether a single motor could be employed and the connection to other stands made by gearing. It was decided, Mr. Holloway asserted, that since the slab was in only one stand at a time the single motor would be permissible and that connection to other stands through gears would be more economical than the individual drives. Each stand transmits normally about 10,000 horsepower with occasional peaks of 12,000.

At the time the drive was designed no gearcutting equipment in the country was large enough to receive the gears and it became necessary to design a special machine. The end mill method of forming was selected because the tool cost was lower than cutters of the rotary type and the distance of end travel during a cut is much less than a rotary-type tool. Extreme care by the machine operator and inspection department resulted in a remarkable standard of accuracy considering the bulk involved. It was found that, as near as could be measured, the total inaccuracy was 0.008-inch in tooth division and contour.

Combined motor and speed reducer units furnish a solution to a better means for mechanical transmission of power where speed reduction is a primary factor, according to R. S. Marthens, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. In this discussion the various phases of design for efficiency, low cost, neat appearance and compactness were treated.

Advantage of the cyanide case on gears is its excellent wearing properties, E. F. Davis, Warner Gear Co., Muncie, Ind., pointed out in his address on the heat treatment of gearing. The cyanide process of hardening is at present popular not only because of the method itself but the useful properties imparted to the surface of the gear. It is estimated that 75 per cent of the gears now produced are being hardened in a cyanide bath.

"A myth I would like to explode at this time," said Mr. Davis, "is that the process of cyaniding makes noisy gears. Bad tooth form is the chief cause of this condition. It often has been assumed that cyanided gears had a higher pitched tone but after observing one transmission model in production for three years with rejections not over 1 per cent I see no basis for the assumption that the operation of cyaniding has any influence on the acoustics of transmission gearing."

Economizes by Welding

Various elements comprising a welded steel gear assembly were depicted by Everett Chapman, Lukenweld Inc., Coatesville, Pa. In outlining the record of this type of gear he explained that there have been only two cases of vibration troubles reported in a total of 800 units. Economic advantages of welded gears lie in the fact that scrapping of partially finished gears, perhaps carrying a heavy machine investment, is eliminated. Wear and tear on hobbing tools is minimized and the burden of a pattern shed is avoided.

Chester B. Hamilton, Hamilton Gear & Machine Co., Toronto, Ont., described tests of worm gear speed reducers for power capacity and lubrication data. In his paper he developed a new basis for a possible rational formula for power rating of worm gear drives.

Gear lapping methods after heat treatment were summarized by R. S. Drummond, National Broach & Machine Co., Detroit. Recent advances in gear correction practice have made it possible to remove an amount of material hitherto considered impracticable, if not impossible. It now is economically practicable to remove all the distortion resulting from normalizing treatment.

Perfects Improved Type of Cement-Lined Steel Pipe

DEVELOPED to meet the need for a steel pipe resistant to various corrosive solutions, this new pipe is provided with a special type of cement lining, and is supplied in a wide range of sizes and weights

DEFINITE need is said to exist for a pipe that is more resistant to corrosive waters and corrosive solutions than either uncoated or galvanized iron or steel pipe. The problem has been aggravated by the rapid development of industrial processes which involve the handling of large volumes of corrosive solutions, and by the increasing use of softening treatments and those treatments given to assist the filtration and clarification of domestic water supplies.

In an effort to develop a superior type of cement-lined pipe, National Tube Co., Pittsburgh, has conducted extensive research work on the composition of special cements intended primarily for corrosion-resisting pipe linings. This work has resulted in the development of a new product—Duroline pipe.

The new pipe is lined with a special mixture which has considerably less solubility than ordinary Portland cement mixtures. Special methods of curing have been evolved which, combined with the chemical composition, result in a minimum of shrinkage during setting. At the same time, mechanical skill has devised improved procedure for introducing the lining into the pipe.

Lining Protects Steel

The pipe is produced from the same steel used for regular black or galvanized wrought pipe, butt welded in the smaller diameters and lap welded in the larger. In the composite product the sole purpose of the lining is to protect the metal from corrosion, while the metal in turn supplies the necessary strength and protects the lining from mechanical damage.

The lining machine comprises, essentially, a hollow bar, somewhat longer than the pipe to be lined, and of such internal diameter as to hold, per foot of length, the exact quantity of material required to line one foot of pipe to the desired thickness. One end of this bar is closed while the other carries a head embodying an annular orifice, suitable centering guides, and a mandrel or plug end of the correct diameter to distribute the lining around the inner surface of the pipe. The inside of the bar is fitted with a piston which may be moved back and forth throughout its length by the action of a long piston rod working through a gland in the closed end.

Distribution Is Uniform

In operation, the pipe to be lined is pushed back over the bar head until the entire length encircles the bar, the piston is drawn back to the closed end, and the bar is pumped full of the wet lining mixture. The pipe and the piston rod are then locked together and moved forward so as to strip the pipe off the bar. For each increment of forward motion of the pipe, the piston inside the bar moves an equal distance, thereby forcing a definite amount of the lining mixture through the annular orifice of the bar head into the pipe. As the pipe moves off the bar, the mandrel (at the extreme end of the bar) smoothes the deposited cement and assists in obtaining the desired circumferential distribution. This procedure is modified somewhat in the case of the larger sizes of pipe.

Immediately following the above operation the lined pipe is placed on the rolls of a centrifugal machine and spun rapidly for a few minutes. Here the centrifugal and vibratory forces compact the lining, even up its distribution around the inside wall of the pipe and impart to it a smooth, dense surface by an action similar to that known to cement workers as "floating."

Careful mill curing is given the pipe, involving moist air, steam, and hot and cold water treatments extending over a period of several days. The curing treatment, in addition to promoting the development of high strength, leaches out the surface lime compounds and improves the resistance to chemical attack.

Two-Fold Protection

Cement linings have been found to protect pipe in two ways: First, by the alkalinity of the lime in the cement next to the metal; and second, by the blanketing action of the cement layer. While the protection is dependent upon both of these principles, laboratory studies indicate that over long periods of time the blanketing action is the more important.

The type of joint and method of joint protection for use with the pipe are governed largely by the conditions surrounding the particular installation, such as character of the service, size of pipe, corrosiveness of the solution to be carried, etc. The producer recommends the use of couplings and fittings lined with Duroline on all installations. A joint of this type is shown in section in an accompanying illustration, in which it will be noted that the ring of lining material is embedded in a recess in the coupling body, tapering off at each side so that the first few threads on the

Typical section of cement-lined pipe coupling and joint. Note joint compound on end of pipe and on threads

entering pipe cut into the coupling lining and seal off the crevice between pipe and coupling thread surfaces.

Lead-lined fittings may be used when the ends of the pipe are properly faced, or when preferred because of other reasons, as in lines of a temporary nature, or those in which it is expected that the joints will be made up and broken occasionally.

When cutting the pipe in the field, either a good wheel, a square-end, or a machine cutter may be used. Excessive burring will injure the lining and should be avoided.

Among many suggested uses for the pipe are: Underground water supply lines; water supply lines in buildings; industrial water piping; lines in salt and sea water; coal mine drainage lines; oil field applications; handling special corrosive chemical solutions, etc. Where conditions require, the pipe can be furnished galvanized outside only, or made of a copper-steel analysis. If desired, suitable outside protective coatings or wrappings may be applied.

The pipe is supplied in 19 standard sizes ranging from ½ inch to 12-inch; external diameters range from 0.840 to 12.750 inches, internal diameters from 0.484 to 11.251 inches. On these sizes lining thickness ranges from 0.06 to 0.375 inches. Weight per foot ranges from 0.97 pound for the ½-inch size, to 63.43 pounds for the heaviest 12-inch size, with plain ends.

Discuss Engineering For Recovery

THAT many ideas now prevailing in regard to production and manufacturing must be revamped if industry is to meet problems of the next decade successfully was emphasized in the discussions of the conference on "Re-engineering for Economical Manufacture," held in Cleveland, May 10-12, under the auspices of Case School of Applied Science.

At the opening session held Wednesday evening, John M. Carmody, management consultant, New York, outlined three steps necessary in planning for profits. First, he declared, the plant must be made ready for economical production; secondly, the product must be made ready for the market; and thirdly, the customer must be made ready for the product.

As for production, Mr Carmody believes that the majority of industrial plants are obsolete, that great savings could be realized by improving the layouts in the majority of establishments.

In preparing the product for the market, Mr. Carmody predicts that in the future companies will be compelled to pay more attention to what the public wants and can buy. The factors of style and beauty will be emphasized.

Preparing the customer for the product involves the important change that is taking place in the economic status of the country. Now the problem is to distribute what we can make. We must evoke methods to meet this new economic condition, and, said Mr. Carmody, the engineer must assume a broader role in manufacturing in the future.

With Harry A. Schwartz, manager of research, National Malleable & Steel Castings Co., in the chair at the Thursday morning session, Dr. W. E. Wickenden, president, Case School of Applied Science, introduced the subject of the conference.

Speaking on "Production Development—Whither Bound?" E. L. Shaner, editor of STEEL, urged that finance be dislodged from its position of dictatorship over industry and placed where it belongs—as a servant of or aid to industry. He predicted that manufacturers will be obliged to give more heed in the future to the law of diminishing returns as applied to mechanization of plants.

Cites Value of Re-design

R. E. Hellmund, chief electrical engineer, Westinghouse Electric & Mfg. Co., cited numerous examples of how products have been redesigned to increase their appeal to the public. D. Levinger, engineer of manufacturing, Western Electric Co., showed a remarkable series of illustrations of how manufacturing processes have been developed to decrease costs, benefit working conditions and improve quality of product. All three advantages were gained simultaneously through changes in equipment and methods.

At the afternoon session, presided over by Frank H. Johnson, publisher of *Machine Design*, means of insuring net profits from the selection of machine equipment were discussed by H. P. Bailey, assistant to president, Warner & Swasey Co. R. A. Fintz, engineer, White Motor Co., showed how that company introduces changes in plant layout to meet varying schedules of production.

Steel Beer Barrel Has Inner and Outer Shells

Murray Corp. of America, Detroit, announces development of a steel beer barrel which is adapted to standard equipment for cleaning, pitching and filling and which stacks and rolls easily. These barrels are pitched ready for use and have standard bungs and taps. The inner surface of the container is made porous by a special process so that the pitch will adhere tightly.

The container weighs approximately half as much as the ordinary wooden barrel, is formed of rust-proofed steel and has bulged sides to facilitate complete drainage. Smooth inside surfaces insure cleanliness.

One of the important features is insulation against heat and consequent deterioration of contents. The barrel is formed in two sections; one is the inner container, which is built up by welding together two half sections and the other is a strong outer shell which is solid seam welded to the inner vessel so as to form air spaces at either end.

Two wide beads are formed around the adjacent rims of the outer shell to form raised runners on which the barrels may be rolled without damage to the inner container and these runners fit standard conveyor systems. Deep chimes formed in the ends of the outer section permit easy gripping for handling.

Adds Junior Firebrick to Refractory Line

Developed to meet conditions existing between the moderate service economically met by fireclay refractories and the heavy-duty demands met by higher grades of firebrick, a new type of firebrick, known as B & W 80 Junior, has been announced by the Babcock & Wilcox Co., 85 Liberty street, New York.

The new brick has a melting point of 3175 degrees Fahr., its pyrometric cone equivalent being 33, according to the manufacturer. Melting point tests were made with carefully calibrated optical pyrometers. Shrinkage of the brick is said to be only 0.85 per cent after reheating at 2900 degrees Fahr. for 5 hours. The new refractory is claimed to have no free quartz in its composition, therefore being highly resistant to spalling. Tests have shown only a 20 per cent spalling loss after 18 cycles of alternate heating to 2900 degrees and cooling with an air blast.

Standard load tests, made by applying a constant load of 25 pounds per square inch to the brick and increasing the temperature at a rate prescribed for heavy-duty firebrick, showed no deformation at 2660 degrees Fahr., and 10 per cent deformation at 2780 degrees.

High qualities of the material are attributed to the use of a blend of calcined kaolin grog and bond clays, and to a special treatment in a manufacturing process developed by the maker. The brick has a decided brown color with white grog particles. Breaking tests reveal fracture across these grog particles, indicating a strong "welded" structure. For all practical purposes, weight is 7¾ pounds for a 9-inch straight brick.

IMPROVING OPEN-HEARTH FURNACE DESIGN

BY WILLIAM C. BUELL JR

Part V—Open-Hearth Furnace Lines

(Thirty-Second Article of Series)

IF THE fuels listed in Table LV as being used in open-hearth furnace operations are solved for the air volumes used in and the furnace gas volumes developed by their combustion per unit of fuel fired, it is then a simple matter by the use of these several data to compute the fluid volumes moving in a furnace for a given time unit. These data which are developed by ordinary combustion calculations are given in Table LVI and for convenient comparison are in each case calculated for 1,000,000 B.t.u. of heat released.

Requires Certain Temperatures

As is well understood, temperature, through volume and density modification has a great effect on gas fluid velocity through the furnace. Therefore as another step in the determination of velocity flow through the critical areas it is required that certain temperature values be adopted. The values listed in Table LVII while arbitrary are actually based on various data from several plants and are thought to be representative, bearing in mind the following hypotheses from which they have been developed. Of the 16 furnaces under study all but three have records based on the production of low-carbon (0.10 to 0.20) steels. Some 75 readings from 15 plants have developed a mean pouring temperature of low-carbon steels of slightly more than 2900 degrees Fahr., which is the base figure taken for this practice. However, the surface temperature of the slag is somewhat higher than the mean pouring temperature, say 100 degrees which will give the slag surface a temperature of 3000 degrees Fahr.

The temperature of the gases leaving the furnace at the outgoing knuckle, area A_2 must of course be in excess of the slag surface temperature. Accordingly, the temperature of the gases at A_2, in the case of all the different fuels is assumed as 3100 degrees Fahr., and this figure finds a considerable degree of substantiation both in the literature and in research records, of various plants.

The figures of maximum temperature used do not represent theoretical flame temperatures, being materially lower, but rather the temperature of a considerable volume of combustion gases at their average maximum temperature. These temperatures should develop in the first half of the gas travel over the bath and then fall rapidly during passage over the last half of the bath to the knuckle which marks the limit of useful effect. As shown the figures can be considered as applying to short-flame firing only; long-flame firing shows an increase of temperature at the outgoing knuckle. The variation of values for the different fuels is based on the inherent properties of the several fuels as temperature developing media, and they represent the approximate maxima for roof economy.

Based on Actual Practice

The temperatures given as those of the air and preheated mixed and producer gases are based on numerous operating results and likely are of considerable accuracy. The temperature indicated for the incoming knuckle has been developed graphically and is therefore merely an estimate.

For the purpose of calculating velocity flow within the furnace system the following method employing various data from Tables LIII to LVIII, inclusive, and involving two distinct steps is used.

The first step is the determination of the volumes of fuel, air and furnace gases actually flowing within the system and this is best accomplished by the development of a fuel factor by which the unit fluid volumes for the various fuels from Table LVI may be multiplied to give

Equation No. 22

$$F = \frac{\text{Gross tons ingots produced} \times \text{B.t.u./gross ton of ingots} \times 1.50}{1{,}000{,}000 \times \text{time of heat in minutes} \times 60} \quad \ldots\ldots (22)$$

All descriptive values in this equation are as in Table LV.

Table LVI

Fluid Volumes Moving in an Open-Hearth Furnace[1]

Fuel	Symbol	Fuel, cu. ft.	Volume of Air, cu. ft.	Furnace gas, cu. ft.
Coke oven gas	C	1900	8550	9500
Fuel oil or tar	T	6½*	8775	9750
Natural gas	N	900	9000	10,800
Mixed gas	M	4200	9200	13,200
Producer gas	P	7500	8250	15,750

*Gallons.

[1]Volumes as at 32 degrees Fahr. and 30 inches mercury calculated for 1,000,000 B.t.u. of heat released.

Table LVII

Open-Hearth Furnace Gas Temperatures, Degrees Fahr.

		FUEL				
Location in furnace	Area	C-T*	N*	M* (Preheated)	M* (Cold)	P*
Air uptakes	A_6	2200	2200	1700	2200	1800
Fuel nozzle	A_5	atm.	atm.	2100	atm.	2000
Knuckle, incoming	A_4	3200	3150	3150	3100	3150
Maximum temperature	A_1	3500	3450	3450	3400	3400
Mean temp. over bath	A_2-A_4	3350	3300	3300	3280	3280
Knuckle, outgoing	A_2	3100	3100	3100	3160	3100
Downtakes	A_3	3000	3000	3000	3000	3000

*For meaning of symbols see Table LVI.

the volumes of the several fluids in the measure of cubic feet per second. The factor is actually the maximum fuel input to the furnace in the term of 1,000,000 B.t.u. per second and is developed by Equation No. 22.

The value of F as is apparent from this equation will be a factor one and one-half times the average flow value as for the total time of the heat. The computation is thought to be representative of the maximum flow conditions which produce the highest gas velocities.

If the volume values for fuel, air and furnace gas listed to the appropriate fuel in Table LVI each are multiplied by F the result will be the volume of that particular component of combustion flowing in terms of cubic feet per second as at 32 degrees Fahr. Calculated by this method the values for the 16 typical furnaces will be as in Table LVIII.

The final factors required in the determination of flow velocities through given areas are those derived from thermal effect upon the properties of the fuel, air and gases of combustion. In the following discussion of these changes the volumes of a gaseous fluid and its specific gravity (or density) are taken as unity at 32 degrees Fahr. The volume therefore varies directly as 459.4+ degrees Fahr, is to 491.4; and, the density inversely as the volume.

Velocity Increase Varies

Assuming the pressure moving the gaseous fluid through the furnace remains constant, and this is a justified and reasonable assumption in the practice in question, then the increase of velocity resulting from a decrease in density will vary inversely as the square root of the density. These several factors are tabulated in detail in Table LVIII. Inspection of this table will develop the fact that actually the specific velocity D is the square root of the specific volume B and from this it may be stated as a rule that the pressure remaining the same the area (ignoring friction) required to pass an equal volume of gas at any temperature or the velocity through a fixed area will vary as the square root of the specific volume.

Working from the base of 32 degrees Fahr. this offers a simple method of calculating the necessary areas throughout the furnace system and on this account the complete table is included.

With the fluid volumes of the fuel, air and the furnace gases established it is now a relatively simple matter by the appropriate introduction of the data on the thermal effects on the fluids and the areas to find the velocity of fluid flow at the critical points. The equation to accomplish this is,

$$V = \frac{FV \times TF}{AS} \qquad \text{..... (23)}$$

in which:

V = Velocity in feet per second as at 32 degrees Fahr.

FV = Fluid volume as befitting the furnace and fluid component of Table LIX.

TF = Thermal factor, the value of specific velocity taken from column D in Table LVIII for the appropriate temperature of Table LVII.

AS = Area of anv cross section as from Table LIII.

(To be continued)

Table LVIII

Relative Change in Properties of Perfect Gases Effected by Temperature

Temperature	Specific Volume	Specific Gravity	Specific Velocity	Temperature	Specific Volume	Specific Gravity	Specific Velocity	Temperature	Specific Volume	Specific Gravity	Specific Velocity	Temperature	Specific Volume	Specific Gravity	Specific Velocity
A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
32	1.0	1.0	1.0	1020	3.0006	0.3326	1.733	2020	5.0456	0.1984	2.247	3020	7.0797	0.1412	2.661
40	1.0163	0.9839	1.008	1040	3.0413	0.3289	1.742	2040	5.0863	0.1966	2.256	3040	7.1204	0.1404	2.668
60	1.0670	0.9461	1.028	1060	3.0820	0.3247	1.754	2060	5.1270	0.1950	2.265	3060	7.1611	0.1397	2.676
80	1.0977	0.9107	1.047	1080	3.1227	0.3206	1.767	2080	5.1677	0.1934	2.274	3080	7.2018	0.1389	2.683
100	1.1384	0.8787	1.066	1100	3.1634	0.3162	1.779	2100	5.2084	0.1919	2.283	3100	7.2425	0.1381	2.691
120	1.1791	0.8482	1.086	1120	3.2041	0.3122	1.789	2120	5.2491	0.1905	2.291	3120	7.2832	0.1374	2.698
140	1.2198	0.8197	1.104	1140	3.2448	0.3082	1.802	2140	5.2898	0.1890	2.300	3140	7.3239	0.1366	2.706
160	1.2605	0.8000	1.119	1160	3.2855	0.3045	1.812	2160	5.3305	0.1876	2.309	3160	7.3646	0.1369	2.713
180	1.2912	0.7752	1.136	1180	3.3262	0.3008	1.821	2180	5.3712	0.1862	2.317	3180	7.4053	0.1351	2.721
200	1.3319	0.7508	1.155	1200	3.3669	0.2970	1.835	2200	5.4119	0.1848	2.326	3200	7.4460	0.1343	2.729
220	1.3762	0.7263	1.172	1220	3.4076	0.2935	1.845	2220	5.4526	0.1835	2.335	3220	7.4867	0.1335	2.737
240	1.4133	0.7077	1.189	1240	3.4483	0.2899	1.855	2240	5.4933	0.1820	2.343	3240	7.5274	0.1328	2.744
260	1.4540	0.6878	1.206	1260	3.4890	0.2865	1.866	2260	5.5340	0.1808	2.352	3260	7.5681	0.1321	2.751
280	1.4947	0.6689	1.222	1280	3.5297	0.2833	1.880	2280	5.5747	0.1794	2.360	3280	7.6088	0.1314	2.759
300	1.5354	0.6516	1.239	1300	3.5704	0.2801	1.890	2300	5.6154	0.1781	2.369	3300	7.6495	0.1307	2.766
320	1.5761	0.6345	1.256	1320	3.6111	0.2770	1.901	2320	5.6551	0.1769	2.377	3320	7.6902	0.1300	2.773
340	1.6168	0.6184	1.272	1340	3.6518	0.2740	1.909	2340	5.6958	0.1756	2.386	3340	7.7309	0.1294	2.780
360	1.6575	0.6031	1.287	1360	3.6925	0.2710	1.919	2360	5.7365	0.1743	2.396	3360	7.7716	0.1287	2.787
380	1.6982	0.5889	1.302	1380	3.7332	0.2677	1.931	2380	5.7772	0.1731	2.404	3380	7.8123	0.1280	2.795
400	1.7389	0.5750	1.319	1400	3.7739	0.2653	1.942	2400	5.8179	0.1719	2.412	3400	7.8530	0.1274	2.802
420	1.7796	0.5618	1.333	1420	3.8146	0.2622	1.953	2420	5.8586	0.1706	2.419	3420	7.8937	0.1267	2.810
440	1.8203	0.5495	1.348	1440	3.8553	0.2597	1.961	2440	5.8993	0.1697	2.428	3440	7.9344	0.1261	2.817
460	1.8610	0.5376	1.362	1460	3.8969	0.2565	1.972	2460	5.9300	0.1686	2.435	3460	7.9751	0.1254	2.824
480	1.9017	0.5258	1.379	1480	3.9467	0.2534	1.984	2480	5.9807	0.1673	2.445	3480	8.0158	0.1248	2.832
500	1.9424	0.5149	1.393	1500	3.9874	0.2506	1.996	2500	6.0214	0.1661	2.454	3500	8.0565	0.1241	2.839
520	1.9831	0.5043	1.408	1520	4.0281	0.2481	2.008	2520	6.0621	0.1650	2.462	3520	8.0972	0.1235	2.846
540	2.0238	0.4940	1.422	1540	4.0688	0.2457	2.016	2540	6.1028	0.1639	2.470	3540	8.1379	0.1229	2.853
560	2.0645	0.4842	1.437	1560	4.1095	0.2433	2.028	2560	6.1435	0.1629	2.478	3560	8.1786	0.1222	2.860
580	2.1052	0.4751	1.451	1580	4.1502	0.2410	2.037	2580	6.1843	0.1618	2.486	3580	8.2193	0.1217	2.867
600	2.1459	0.4661	1.466	1600	4.1909	0.2387	2.045	2600	6.2250	0.1607	2.494	3600	8.2600	0.1211	2.874
620	2.1866	0.4578	1.477	1620	4.2316	0.2363	2.057	2620	6.2657	0.1596	2.504	3620	8.3007	0.1205	2.881
640	2.2273	0.4496	1.490	1640	4.2723	0.2340	2.066	2640	6.3064	0.1585	2.512	3640	8.3414	0.1199	2.888
660	2.2680	0.4410	1.506	1660	4.3130	0.2319	2.076	2660	6.3471	0.1575	2.520	3660	8.3821	0.1193	2.895
680	2.3087	0.4329	1.520	1680	4.3537	0.2297	2.086	2680	6.3878	0.1565	2.528	3680	8.4228	0.1188	2.902
700	2.3494	0.4255	1.531	1700	4.3944	0.2277	2.095	2700	6.4285	0.1555	2.536	3700	8.4635	0.1182	2.909
720	2.3901	0.4184	1.546	1720	4.4351	0.2255	2.105	2720	6.4692	0.1546	2.544	3720	8.5042	0.1176	2.915
740	2.4308	0.4113	1.560	1740	4.4758	0.2234	2.117	2740	6.5099	0.1536	2.551	3740	8.5449	0.1170	2.924
760	2.4715	0.4049	1.572	1760	4.5165	0.2214	2.126	2760	6.5506	0.1527	2.559	3760	8.5856	0.1165	2.931
780	2.5122	0.3981	1.585	1780	4.5572	0.2194	2.136	2780	6.5913	0.1517	2.567	3780	8.6263	0.1159	2.938
800	2.5529	0.3917	1.597	1800	4.5979	0.2174	2.146	2800	6.6320	0.1508	2.575	3800	8.6670	0.1153	2.944
820	2.5936	0.3856	1.610	1820	4.6386	0.2155	2.154	2820	6.6727	0.1499	2.583	3820	8.7077	0.1148	2.951
840	2.6343	0.3798	1.623	1840	4.6793	0.2137	2.163	2840	6.7134	0.1490	2.590	3840	8.7485	0.1143	2.958
860	2.6750	0.3738	1.634	1860	4.7200	0.2119	2.173	2860	6.7541	0.1481	2.598	3860	8.7892	0.1138	2.965
880	2.7157	0.3685	1.645	1880	4.7607	0.2101	2.182	2880	6.7948	0.1473	2.606	3880	8.8299	0.1133	2.972
900	2.7564	0.3630	1.658	1900	4.8014	0.2083	2.191	2900	6.8355	0.1464	2.615	3900	8.8706	0.1127	2.979
920	2.7971	0.3571	1.672	1920	4.8421	0.2066	2.200	2920	6.8762	0.1456	2.622	3920	8.9113	0.1122	2.985
940	2.8378	0.3524	1.686	1940	4.8828	0.2049	2.209	2940	6.9168	0.1448	2.631	3940	8.9520	0.1117	2.992
960	2.8785	0.3473	1.698	1960	4.9235	0.2031	2.218	2960	6.9576	0.1437	2.638	3960	8.9927	0.1111	2.998
980	2.9192	0.3425	1.706	1980	4.9642	0.2015	2.227	2980	6.9983	0.1429	2.646	3980	9.0334	0.1107	3.005
1000	2.9599	0.3378	1.720	2000	5.0049	0.2000	2.236	3000	7.0390	0.1420	2.653	4000	9.0741	0.1103	3.012

Making the Most of

METHODS AND MATERIALS

DURING assembly of automobile rear axles, one manufacturer is required to shrink a steel ring gear on the axle assembly unit. The problem was to find a method of expanding this ring gear by heat without warping and with the expansion size accurate to within 0.0001 inch. The solution was found in building a machined cast-iron table top 2½ x 4 feet, and installing on the under side sixteen 500-watt 230-volt electric strip heaters 24 inches long and 1½ inches wide. The units were heat insulated with asbestos and entire top heat insulated from the base. To control heat throughout the length of the table, the elements were connected into four zones of four elements each, each zone being regulated by means of four thermostats having a working range of 150-300 degrees Fahr. Although designed for an 8-kilowatt load, the table handles the work efficiently at 4 kilowatts after it has been brought up to heat. Work moves through the assembly line faster and all warping has been eliminated due to the even heat distribution.

$ $ $

Paddles for clay mixing machines are made from 13.0 per cent manganese steel and are extremely difficult to machine. Using an ordinary cutting tool, the time for cutting a thread on a paddle shank is 2 hours and 40 minutes; a tantalum carbide tool accomplishes the job in 9.5 minutes.

$ $ $

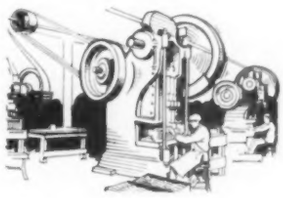
AFTER careful examination of many plated zinc die castings for automobile hardware plated under controlled conditions and given most severe exposures, a zinc manufacturer has concluded that satisfactory service for the average life of an automobile can be obtained by the application of a primary coat of 0.0003 inch of nickel and 0.00002 inch of chromium. Several years ago it took little research to discover that many of these die castings were receiving coatings of considerably less depth than this minimum. Several of the more expensive makes of American cars now specify 0.0005 inch of copper, 0.0005 inch of nickel and 0.00002 inch of chromium. This produces a very fine protective finish.

$ $ $

A yarn manufacturer modernized his plant electrically at a cost of $8000. The annual return, as given by the manufacturer, is $2600.

$ $ $

To insure uniform hardness and structure and satisfactory deep drawing qualities in hot rolled strip steel, containing 0.08-0.12 per cent carbon and 0.30-0.50 per cent manganese, approximately 0.250 inch thick and 3¾-inch wide, and intended for cold



stamping into bearing cups and then machining into bearing races, the steel manufacturer has found it necessary to control the analysis as well as rolling and annealing temperatures. If this is not done, splitting of cups or similar parts will occur in the deep drawing, and even machining difficulties may arise.

$ $ $

A Canadian manufacturer of washing machines has adopted the use of a rustproofing process to prevent corrosion induced by the machines standing in damp laundries and by the splashing of soapy water. Experience proved that it cost more to service an unsatisfactory paint job than mechanical or electrical faults. Since turning to the rustproofing process nearly a year ago, this manufacturer has eliminated all complaints on finish. The machines of this company are made from one-pass cold-rolled steels. After fabrication, the parts are treated and then given one coat of baking enamel, which is dried for 2½ hours at 250 degrees Fahr.

$ $ $

Among the important characteristics of alloy constructional steels, particularly of the nickel alloy steels, is their toughness, which permits the procurement of higher yield points and tensile strengths than in unalloyed steels, without sacrifice of ductility. Or, by adjustment of carbon content and the addition of nickel, improved ductility may be obtained without sacrifice in strength.

$ $ $

COMMISSIONED to place a long idle manufacturing plant in operation, a firm of consulting industrial engineers surveyed the machinery and equipment in the shop and discovered that a large proportion of it was not capable of operation. Lack of attention in the way of lubrication and protection against corrosion had allowed deterioration to take place and it was necessary to undertake an overhauling program before the plant could be started.

$ $ $

A manufacturer of oil burners is providing service men with heat and corrosion-resisting steel mirrors for use in furnaces when adjusting the burner tips. Mirrors made from steel of this composition do not crack and tarnish when subjected to heat.

$ $ $

In welding, when molten bronze is applied to a clean, fluxed surface heated to the proper temperature (a dull red heat) a thin layer of bronze will flow and spread out over the metal a little ahead of the main deposit. The flow will be free and natural like water spreading over a clean, damp surface, and will not have the appearance of water spreading out on a greasy surface. The edge of the molten bronze will not round out but will tend to spread out and flow freely over the heated metal.

OLD-FASHIONED heavy-duty type of marine anchor, above; and at the right, the modern "navy," or stockless type. Anchors, now almost entirely made of steel, weigh from 5 pounds to 15 tons

LARGE USES OF STEEL IN SMALL WAYS

242nd Article ◆ Ship Anchors

LEADING manufacturers report 500 to 600 tons of steel is consumed annually in normal times in producing ship anchors in this country. These include all sizes and types, from 5 pounds to 15 tons. They estimate approximately half the steel tonnage is for replacement, anchors sometimes being lost when caught in rocks.

By far the largest number are found in equipment of small pleasure boats, as marine insurance rules require that they be used; and insurance or no insurance, no owner of an expensive power or sailboat would be caught out without an anchor, or two. To the yachtsman, anchors are "the cheapest form of insurance."

But the larger portion of steel tonnage is represented in anchors for passenger and freight vessels. Some of the transatlantic liners carry anchors weighing 15 tons. Both government and insurance regulations as regards "ground tackle" are strict; these large boats carry two, and sometimes four anchors.

Marine hardware manufacturers—making many items of equipment of steel—who specialize in requirements for small craft, make six or more types of anchors, all of drop forged steel. Each type has some individual feature appealing to the yachtsman, but all fall within several general classifications.

Two General Designs

First, is the old-fashioned, standard, with a cross-arm and points—called flukes; a shank; a stock, either fixed or sliding, and a ring or shackle for fastening to the anchor-chain or rope. Then there are the patented folding anchors, and the mushrooms, the latter as implied by the name consisting of a cast bowl in the center of which is fixed a shank. Weights of these yachtsmen's anchors range from 5 pounds to 500 pounds, though the 5-pounders evidently are intended for ornaments—as the yachtsman's own lexicon calls for at least 1 pound of anchor to each foot of boat.

The modern type, however, is the so-called navy, or stockless, and these weigh from 5 pounds up to 15 tons. The head of this type is cast from steel in one piece, with the flukes set at right angles to the head. The casting is recessed, and the shank is pivoted to it. In one "make" the shank terminates in a head similar to a T-bolt. This is held in place by a steel block which closes the recess, and the block is fastened in tight with a steel pin. The shank in all instances is free to move up or down, to facilitate the flukes plowing into the sand. When the anchor is not in use the shank is pulled up firmly into the vessel's hawse pipe, and the flukes lie flat against the vessel's side. Formerly a forged steel shank always was specified, but now quite frequently the shank is cast.

Specifications Outlined

A considerable amount of ductility is required in the steel; a good elastic limit and high tensile strength. A typical test provides:

1—Test bars taken from each heat must show 60,000 to 70,000 pounds tensile strength, with 15 to 25 per cent elongation in 8 inches, and 20 to 30 per cent reduction in area.

2—A test bar 1 inch square is required to bend cold to an angle of 90 degrees.

3—No metal must run above 0.05 in phosphorus and 0.05 per cent in sulphur.

4—Anchors are subject to a drop test of 12 to 15 feet on steel blocks. Incidentally, sometimes the large anchors will bounce off this surface 6 to 7 feet in the air.

Parts of the anchor are suspended, and "rung" by the inspector wielding a sledge hammer against them, so that he may detect flaws. Finally the anchor is placed in a special testing machine and pulled in various directions—as it might be in actual use—just a little short of its elastic limit. Some receive a "pull" of more than 200,000 pounds.

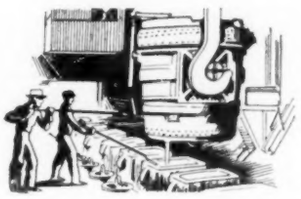
Foundrymen's Association Publishes Transactions

American Foundrymen's association, 222 West Adams street, Chicago, has published Vol. XL of its *Transactions*, containing the proceedings of the thirty-sixth annual meeting of the association which was held in Detroit, May 2-5, 1932.

The publication includes the papers presented at technical sessions, reports of various committees, annual address of president, the report of the annual business meeting and various reports of the directors and executive committee during the year. The volume was edited by Robert E. Kennedy, technical secretary of the association.

PROGRESS IN STEELMAKING

IRON approximately 99.93 per cent pure, now is being marketed in this country by a foreign producer. It is available in the form of cold rolled strip, wire, woven mesh and extruded strip. The new material is being used as gaskets in machinery operating with high pressures and temperatures, and for pressing into dies which later are case hardened. When polished and treated, the metal shows high resistance to atmospheric corrosion.



SUBSTITUTION of magnetic nozzles for fireclay nozzles at a steel plant in Australia has resulted in greater pouring efficiency of manganese heats. The casting action of this grade steel on the fireclay nozzles previously used, resulted in leaky stoppers and reduced metal recovery.

♦ ♦ ♦

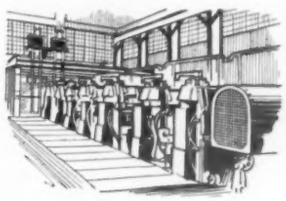
Aluminum in conjunction with a mixture of nickel and chromium is the basis of a new alloy which in the form of sheets has a high luster and ductility. Extruded and structural sections afford a yield point of 60,000 pounds per square inch, an ultimate strength of 70,000 pounds per square inch, with 15 per cent elongation and high elasticity.

♦ ♦ ♦

Acid-resistant material with a sulphur base now is being marketed in 10-pound slabs for pointing joints in acid-proof masonry and for lining concrete tanks. The product has a melting point of 235 degrees Fahr. and is not recommended for use where temperatures exceed 212 degrees Fahr. The melted material is applied either in a plastic or fused state; shrinkage upon cooling is negligible. In lining concrete tanks the product in a liquid state is flowed on the surface with a fiber brush, three applications sufficing to give coatings ranging from ⅛ to ¼-inch thick.

♦ ♦ ♦

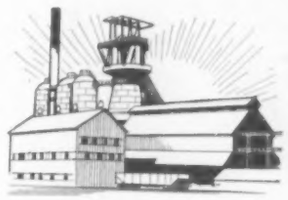
Four-high mills equipped with work rolls 5 inches diameter permit the rolling of low-carbon steel to any gage in the range of tin plate production without the customary intermediate annealing operation. One mill has rolled this grade of steel in coils 36 inches wide from 14 gage to a thickness exceeding 40 gage without the necessity of an anneal between passes.



WOODEN bearings of the lignum vitae type installed on the last stand of a high-speed continuous rod mill in the middle west have been in service 784 hours and have afforded the production of 20,210 net tons of rods. This campaign represents ten times longer wear at one-ninth the cost of bearings formerly used.

♦ ♦ ♦

Packaging nails, washers, nuts and bolts may be accomplished by a vibrator-type filling machine. A recently marketed unit is capable of filling up to two hundred 1-pound containers an hour to a tolerance of 1/64-ounce. The device controls the automatic feed of the product coming from supply bins to scales, and the automatic weighing of a predetermined quantity for each package. Weights equivalent to that of the filled package are placed on the weigh platter of the dial-type scale. The vibrator, attached to the scale, is supplied with the product from a nearby bin or hopper. Press of a button starts the vibrator and the commodity is fed into the container. When the predetermined quantity is packaged, an "electric eye" or phonotronic cell stops the vibrator and thus the flow. On large drafts, material can be proportioned at a speed of tons an hour.



CONSERVATION of space and simplification of the gas cleaning system at blast furnaces are claimed for an electric cleaner now being developed. The new unit, which combines the final cleaning appurtenances with the primary washer to form a single vessel, indicates a possible saving of approximately $0.085 per 100,000 feet of gas cleaned, or about $0.105 per ton of iron.

♦ ♦ ♦

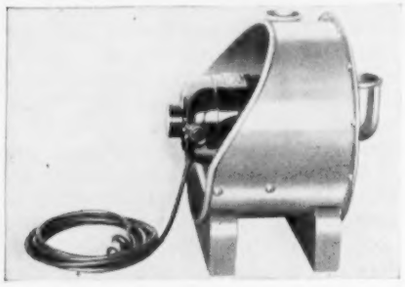
Anahydrous lime base lubricant, which will not separate by vibration, has been developed for crane journal bearings packed with wool waste. At a mill in the Chicago district the wool yarn waste in short lengths is set vertically in the oil boxes to afford capillary attraction to the journal. Track wheel bearings of cranes are equipped with a pan containing wool waste to absorb any drippage of oil and the waste is renewed about every three months. Curtailment of oil drippage in the finishing department has greatly reduced the spoilage of sheets.

NEW EQUIPMENT

PRODUCTION FABRICATION TREATMENT FINISHING

Introduces Turbo-Compressor For Individual Air Service

Spencer Turbine Co., Hartford, Conn., is manufacturing what is claimed to be the smallest multistage centrifugal compressor ever built. This unit, shown herewith, is self-contained and will deliver 75 cubic feet of air per minute at a 12 ounce



Multistage centrifugal compressor built by Spencer Turbine Co.

pressure. Diameter is 12 inches and weight 4 pounds. A 1/3 horsepower alternating or direct-current motor is used. The turbo-compressor is employed for individual operation of all forms of heat treating equipment, gas boosters and other devices requiring low pressure air.

◆

Centrifugal Pump Embodies Self-Priming Device

Chain Belt Co., Milwaukee, recently announced a new 3-inch self-priming centrifugal pump. The new unit is of the recirculating type, and is automatic in action after the recirculating system once is filled. This particular size has been developed to provide a pump close to the same light weight portability of the 2-inch class, with a greatly increased capacity. The unit weighs 385 pounds, is 34 inches high and 37 inches wide, and it is capable of a variety of capacities.

◆

Adds New Welding Torch To Line of Apparatus

Linde Air Products Co., 30 East Forty-second street, New York, has announced the addition of a new welding torch to its line of oxyacetylene apparatus. Designated as No. 28, this new unit has the same wide range of usefulness, and the same high efficiency and economical gas consumption as the No. 20 torch but is somewhat different in design. Its utility is such that it will handle heavy-duty work as easily as the average job.

Ten one-piece, 60 degree gooseneck tips, numbered from 6 to 15, are available for use with this torch. By means of a union nut these tips may be adjusted so as to point in any direction. Thus, overhead or vertical welding can be accomplished without any change in the normal grip of the torch handle. Tips Nos. 6, 8, 10, 12, and 14 are furnished with the torch, giving it a range from 16 gage sheet up to heavy castings.

◆

Grinder Sharpens Lathe And Planer Tools

Wells Mfg. Co., Greenfield, Mass., recently developed a machine to grind and finish lap tool bits of either high-speed steel of tungsten carbide. The machine consists of two units, one for grinding and the other for lapping. For roughing out the tool a face grinding wheel is mounted directly on the motor. This wheel is in two parts, the outer ring being a course abrasive for rough grinding and the central section finer for finish grinding. On the right hand side of the machine is a two part lap which is belted from the motor. Outer ring of the lap is charged with a special abrasive to lap out all wheel marks; the center section has a finer abrasive to lap the tool to a smooth, keen edge.

◆

Escapement Type Integrator Features Fluid Meters

Bailey Meter Co., 1050 Ivanhoe road, Cleveland, recently announced that the most outstanding development incorporated in its new line of fluid meters is the escapement type integrator. The total flow in gallons, pounds or other units is given on a six-figure counter. A heart-shaped cam which has a uniform angular rise is geared to a synchronous motor and rotated at the rate of two revolutions per minute. By means of a friction clutch between the cam and escape wheel and integrator drives the escape wheel and integrator counter at constant speed when the pawl is not engaged. When the pawl engages with the escape wheel the integrator counter is held stationary but the friction clutch allows the cam to continue rotation.

◆

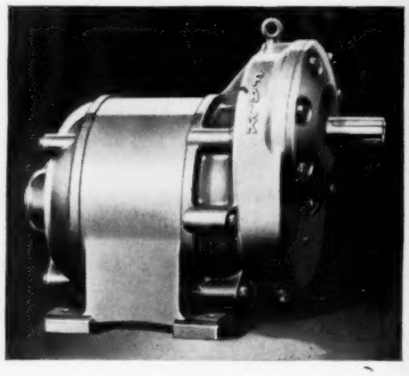
Cold Roll Forming Unit Designed for Speed

Kane & Roach Inc., Syracuse, N. Y., recently placed on the market a cold roll forming machine, outboard housing type. The unit is designed for high speed, having a production of 270 feet per minute. Drive from motor is by V-belts to line shaft to which is coupled a series of worm reduction units, each one driving a proportionate number of roll stands. Worm drives, couplings and spur gears operate in an oil bath in oil tight cases and all bottom roll shaft and intermediate shaft bearings are automatically lubricated from the oil supply in the case.

◆

Designs Motorized Reducers For Low Ratios

Falk Corp., 3027 West Canal street, Milwaukee, has announced that both speed reduction and speed increase are obtainable with its



Geared head motorized speed reducer developed by Falk Corp.

geared-head motoreducers especially designed for relatively low ratios. These units, shown herewith, are a combination of motor and gear unit and make possible the use of high speed motors. Variation of speed secured with a single pair gear train ranges from one-ninth motor speed to about 2½ times motor speed in the various units in the line.

COLD DRAWING
to Exacting Standards

COLD drawing is of tremendous importance in reducing the costs of machining operations on steel bars and in improving steel properties.

By this process accurate size and uniform cross section are obtained and the entire surface is "machined" to a clean, smooth, bright finish free from scale.

Cold drawing increases tensile strength and elastic limit. It greatly improves machinability as well as torsional strength and hardness.

Union Cold Drawn Steels are finished to narrow tolerance and made to exacting quality standards. They possess a high development of all those characteristics so essential to best results when the bars are processed at your plant.

UNION DRAWN STEEL CO.
MASSILLON, OHIO

COLD DRAWING PROVIDES MAXIMUM MACHINABILITY

COLD DRAWN
ROUNDS, FLATS & SPECIAL SHAPES
with Ground and Polished Surface

GROUND FINISH ON ONE OR MORE SURFACES

ACCURATE TO SIZE (*Narrow Tolerance if Desired*)

STRAIGHT

CONCENTRIC

NARROW SIZE TOLERANCE

MIRROR-LIKE FINISH

STRAIGHT

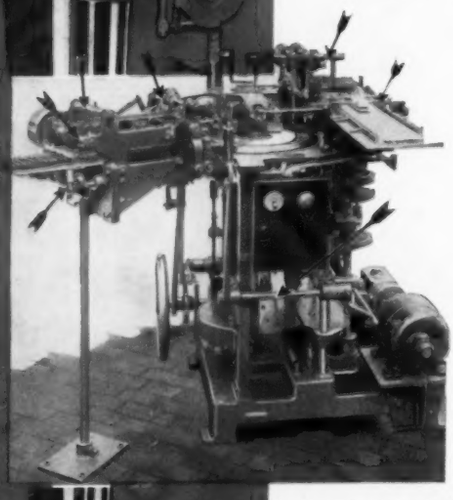
THESE Union Special Finish Bars are economical for uses requiring a surface free from any defects such as that necessary for nickel or chrome plating. You avoid expensive operations in your plant to obtain the proper finish on the steel.

Only during the past year have flats, squares or special shapes been furnished in bar lengths with ground surfaces. Hundreds of applications have proven the advantages of this Union Drawn development.

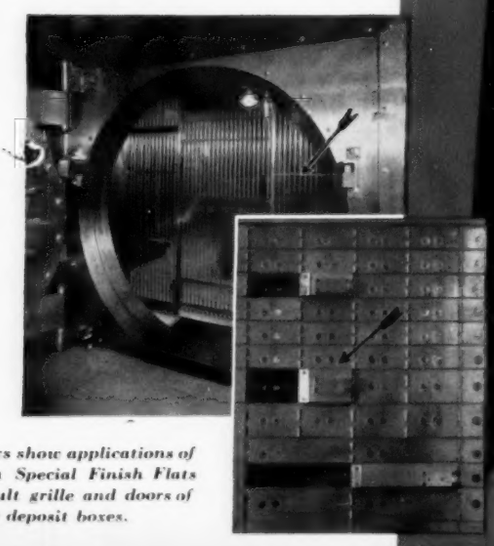
Union Special Finish in rounds has long been noted for its precision in diameter, concentricity and straightness. It fills many requirements, particularly for shafting in smaller sizes. Made of Bessemer screw stock it replaces drill rod wherever accuracy and fine finish rather than hardness are the essential requirements.

All shapes of Union Special Finish Bars are procurable in any analysis including stainless steels. Lengths are not restricted; short cut pieces or long bars may be specified.

UNION DRAWN STEEL COMPANY
MASSILLON, OHIO



Arrows show applications of Union Special Finish in this cellophane cigar wrapper.



Arrows show applications of Union Special Finish Flats in vault grille and doors of safety deposit boxes.

UNION COLD DRAWN STEELS

Steel Rate Up to 36%; Mills Acquire Backlog

Sheet, Strip and Tin Plate Shipments Deferred in Some Districts—Scrap Advance Slows Up—Pig Iron Demand Heavier—Equipment Orders Gain

NEW bookings for finished steel were sufficiently heavy last week not only to push up the steelworks operating rate 3 points to 36 per cent, highest since June, 1931, but also to build moderate backlogs in some products, and to defer deliveries.

The virility of the rise in steel demand and production, initiated immediately following the bank holidays in March, convinces iron and steel interests that the present improvement is deeper rooted than a belated spring rise. Persistent buying by steelmakers in their efforts to accumulate stocks of basic materials indicates the foundation is being laid for a long upswing in operations.

Steelworks operations in the Wheeling district last week led the country with a rate of 65 per cent, up 4 points. Cleveland was second at 54 per cent, a gain of 6 points. Youngstown district advanced 10 points to 43 per cent, Chicago 1½ to 31 per cent, Pittsburgh 2 to 24 per cent, Birmingham 6 to 20 per cent, Philadelphia 1 to 16½ per cent. Detroit and Buffalo held at 38. Some tin plate mills were operating at 100 per cent, the average being 60.

Steelworks still are avid for scrap, but the rise in prices apparently has slowed up for the present, for one reason because scrap prices have practically caught up with pig iron. At Pittsburgh prices are definitely weaker due to the long position of dealers. Following its recent purchase of 89,000 tons of Southern Railway scrap, Weirton Steel Co. has acquired 260,000 tons from the Baltimore & Ohio.

Heavier buying of pig iron has been induced by prospects for higher prices. Chicago furnaces have advanced 50 cents a ton; Pittsburgh and Cleveland producers probably will move up this week. Lake blast furnaces have shipped more iron so far in May than in all April. Furnace coke is being contracted for the remainder of the year. Chrome and magnesite brick prices are up $2.50 to $7 per 1000.

Sheet and stripmakers, some of whom now are equipped with backlogs for two to three weeks, believe the peak has not been reached in the buying movement for automobiles, household equipment and miscellaneous requirements. The market for commercial steel bars, which enter into a wider range of products than any other finished steel, has broadened to include many lines of manufacture long idle.

This surge in steel mill activity is reflected in equipment orders; three large strip mills having been purchased by independent steel companies. And it also is evident in new requirements for manufacturing plants. Repair orders for presses in the last two weeks at Cleveland have increased 300 per cent.

Plate, shape and pipe requirements have not responded as broadly to the upswing in industrial conditions. At Pittsburgh, inquiries for 160 oil barges requiring 40,000 tons of plates are pending. The $3,000,000,000 government construction program, nearing release, will revitalize federal and state bridge and highway work. Structural steel awards for the week, 10,015 tons, include 6000 tons additional for the San Francisco-Oakland bridge. Concrete reinforcing bar prices are up $4 a ton in eastern markets.

The recent swift transition in steel demand is further indicated by the output of steel ingots for April, which at a daily average of 53,392 gross tons, highest in 14 months, was up 61.7 per cent over March. Total production for the month was 1,334,797 tons, compared with 891,153 in March, and 1,233,603 in April, 1932.

STEEL's iron and steel price composite this week is up 4 cents to $28.33; the finished steel composite is unchanged at $45.10; while the scrap composite has advanced 16 cents to $9.16.

Composite Market Averages

	May 13	May 6	One Month Ago April, 1933	Three Months Ago Feb., 1933	One Year Ago May, 1932	Ten Years Ago May, 1923
Iron and Steel Composite	$28.33	$28.29	$28.16	$28.31	$29.62	$47.52
Finished Steel Composite	45.10	45.10	44.94	45.35	47.62	68.43
Steelworks Scrap Composite	9.16	9.00	7.23	6.33	7.03	22.95

Iron and Steel Composite:—Pig iron, billets, slabs, sheet bars, wire rods, tin plate, nails, sheets, plates, shapes, bars, and black pipe. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate pipe. Steelworks Scrap Composite:—Melting steel, compressed sheets.

COMPARATIVE PRICES OF IRON, STEEL AND COKE

Representative Market Figures for Current Week, Last Month, Three Months and One Year Ago

	May 13, 1933	April 1933	Feb. 1933	Mar. 1932
Pig Iron				
Bessemer, del. Pittsburgh	$16.26	16.26	15.76	16.13
Basic, valley	14.00	14.00	14.00	15.00
Basic, eastern, del. eastern Pa.	15.19	14.19	13.50	15.00
No. 2 foundry, del. Pittsburgh	15.76	15.76	15.76	16.16
No. 2 foundry, Chicago	16.00	15.50	15.50	15.60
*Southern No. 2, Birmingham	12.00	11.40	11.00	11.00
**No. 2X, Virginia furnace	17.75	17.75	17.75	18.00
**No. 2X, Eastern, del., Phila.	15.76	14.51	13.76	14.76
Malleable, valley	14.50	14.50	14.50	15.00
Malleable, Chicago	16.00	15.50	15.50	15.60
Lake Superior charcoal, del. Chi.	23.04	23.04	23.04	23.04
Gray forge, del. Pittsburgh	15.63	15.63	15.63	15.63
Ferromanganese, del. Pittsburgh	73.24	73.24	73.24	80.24

*1.75-2.25 silicon. **2.25-2.75 silicon.

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c per gross ton, beginning Jan. 4, 1932.

Coke				
Connellsville, furnace, ovens	1.75	1.75	1.75	2.15
Connellsville, foundry, ovens	2.25	2.25	2.50	3.15
Semifinished Material				
Sheet bars, open-hearth, Youngs.	26.00	26.00	26.00	26.00
Sheet bars, open-hearth, Pitts.	26.00	26.00	26.00	26.00
Billets, open-hearth, Pittsburgh	26.00	26.00	26.00	27.00
Wire rods, Pittsburgh	35.00	35.00	35.00	37.00

	May 13, 1933	April 1933	Feb. 1933	Mar. 1932
Finished Material				
Steel bars, Pittsburgh	1.60	1.60	1.60	1.60
Steel bars, Chicago	1.70	1.70	1.70	1.70
Steel bars, Philadelphia	1.91	1.91	1.91	1.91
Iron bars, Chicago	1.65	1.65	1.65	1.65
Shapes, Pittsburgh	1.60	1.60	1.60	1.60
Shapes, Philadelphia	1.65	1.65	1.65	1.75
Shapes, Chicago	1.70	1.70	1.70	1.70
Tank plates, Pittsburgh	1.50	1.55	1.60	1.60
Tank plates, Philadelphia	1.54½	1.49½	1.59½	1.79½
Tank plates, Chicago	1.70	1.70	1.70	1.70
Sheets, No. 10 blue anneal., Pitts.	1.55	1.55	1.60	1.70
Sheets, No. 24, hot ann., Pitts.	2.00	2.00	2.00	2.20
Sheets, No. 24 galvan., Pitts.	2.70	2.65	2.50	2.85
Sheets, No. 10 blue anneal., Chi.	1.70	1.70	1.85	1.85
Sheets, No. 24 hot ann., Chicago	2.15	2.15	2.15	2.35
Sheets, No. 24 galvan., Chicago	2.85	2.80	2.75	3.00
Plain wire, Pittsburgh	2.10	2.10	2.10	2.20
Wire nails, Pittsburgh	1.85	1.85	1.85	1.95
Tin plate, per base box, Pitts.	4.25	4.25	4.25	4.75
Scrap				
Heavy melting steel, Pitts	$11.75	9.90	8.35	9.75
Heavy melting steel, eastern Pa.	9.25	6.90	6.50	6.44
Heavy melting steel, Chicago	8.75	6.55	5.25	6.20
No. 1 wrought, eastern Pa.	10.25	7.35	6.50	7.75
No. 1 wrought, Chicago	8.10	5.25	5.00	5.25
Rails for rolling, Chicago	10.25	8.25	7.75	8.25

Sheets

Automotive and Refrigerator Requirements Holding Up—Pittsburgh Releases Moderate

SHEET PRICES, PAGE 39

Pittsburgh—The fast moving rate of specifications for sheets which prevailed through the latter part of April and early May tapered slightly last week. Prices continue strong, with all new black sheet business at 2.10c, Pittsburgh, and galvanized 2.70c. Cold-rolled grades remain generally untested at the new prices due to the previous willingness of mills to extend contract coverage at the old figures for the remainder of this quarter.

Cleveland—Northern Ohio sheet producers, continuing to operate at 50 to 65 per cent, with no abatement in specifications, appear confident that demand has not yet reached the peak of the present buying movement. Larger tonnages are in prospect from the automotive industry, refrigerator manufacturers, and miscellaneous sources. Mills are acquiring backlogs and scheduling operations farther ahead, while calls for prompt shipments are becoming more insistent. In few instances have lake mills protected consumers for third quarter at current prices. Some makers are protecting builders at current prices for "the life of the model" for which the sheets are to be used; others are asking premiums for third quarter protection. Refrigerator manufacturers are not covering into third quarter. Demand from stovemakers has stepped up. Inquiries have developed for sheets for advertising signboards for beer, the brewery industry now entering the competitive phase. All sheet prices are firm at the recently announced levels.

Chicago—Sheet business is well maintained, orders and shipments during the past week retaining the improvement recorded over the past six weeks. A declining tendency in automotive orders is offset by increased requirements among other consumers, although some decrease in motor car assemblies is looked for next month. Consumption by the electrical refrigerator industry is heavy, while some smaller sheet users also are enjoying improved operations. Farm implement manufacturers continue light buyers, with the outlook for this industry more favorable. New prices, representing advances of $2 a ton over contracting levels, are receiving occasional tests on small purchases. Some expectations are held of even higher prices by third quarter. Sheet mill operations continue around 40 per cent.

Philadelphia—Buying of autobody and barrel tonnage, the mainstay of the sheet market in recent weeks, is being augmented by slightly better demand from miscellaneous sources. Buying for jobbers' stocks is substantially better. New business is showing no particular strength at the moment.

United States Steel Products Co. has been awarded approximately 140 tons of galvanized copper-bearing corrugated roofing sheets for Panama at $9530.64, delivered; bids April 25.

Cincinnati—Some purchasing is being done on the conviction that higher quotations will be announced for third quarter. Operations are sustained close to 50 per cent. A southern Ohio metalworking plant has placed 1500 tons of sheets for 240,000 welded beer cases.

St. Louis—Miscellaneous sheet requirements still feature the market, with moderate expansion in new orders and improvement in specifications. Consumers are covering farther ahead.

San Francisco—A substantial tonnage of No. 18 gage sheets will be required for 17,000 single trip gasoline containers, 50 to 55 gallons each, for the navy, delivery San Francisco; bids May 23.

CURRENT FINISHED STEEL PRICES

Delivered prices subject to freight surcharge corrected to nearest ½c. Asterisk denotes price change this week

Sheet Steel

HOT ROLLED No. 10
(24 to 48 inches wide)

Pittsburgh, base	1.40c to 1.50c
*Chi. dist mills	1.50c to 1.60c
*Chicago, del.	1.55c to 1.65c
New York, del.	1.75c
Birm., base	1.55c
Philadelphia, del.	1.71c
St. Louis, del.	1.84c

HOT ROLLED ANN. No. 10

Pittsburgh, base	1.55c to 1.65c
Chi. dist mills	1.65c to 1.75c
Chicago, del.	1.70c to 1.80c
Phila., del.	1.96c
New York, del.	2.00c
St. Louis, del.	1.89c to 1.99c
Birm., base	1.70c to 1.80c
*San Fran., c.i.f.	2.12½c

HOT ROLLED ANNEALED No. 24

Pittsburgh, base	2.00c to 2.10c
Chi. dist. mills	2.10c to 2.20c
Chicago, del.	2.15c to 2.25c
New York, del.	2.45c
Phila., del.	2.31c to 2.41c
Birm., base	2.15c to 2.25c
St. Louis, del.	2.44c
*San Fran., c.i.f.	2.75c

GALVANIZED No. 24

Pittsburgh, base	2.60c to 2.70c
Chi. dist. mills	2.80c
Chicago, del.	2.85c
Philadelphia, del.	3.01c
New York, del.	3.05c
Birm., base	2.75c to 2.85c
St. Louis, del.	3.04c
San Fran., c.i.f.	3.35c

TIN MILL BLACK No. 28

Pittsburgh, base	2.30c
Gary, base	2.40c
St. Louis, del.	2.64c

HEAVY COLD ROLLED No. 10

Pittsburgh, base	1.90c to 2.05c
Chi. dist. mills	2.00c to 2.15c
Chicago, del.	2.05c to 2.20c
Philadelphia, del.	2.36c
New York, del.	2.40c
San Francisco	2.70c

COLD ROLLED No. 20

Pittsburgh, base	2.30c to 2.45c
Do, autob. qual.	2.55c to 2.70c
Do, furn. qual	2.90c to 3.05c
Chi. dist. mills	2.40c to 2.55c
Chicago, del.	2.45c to 2.55c
Philadelphia, del.	2.61c to 2.76c
New York, del.	2.80c

ENAMELING SHEETS

Pitts., No. 10	2.40c
Pitts., No. 20	2.90c

Tin and Terne Plate

Per 100-lb. box, Pittsburgh

Tin plate, coke base, contract	$4.25
Do., stock	3.75
Long ternes, No. 24 unassorted	2.75c

Gary base, 10 cents higher.

Corrosion, Heat Resistant Alloys

Base, Pittsburgh

18% chrome, 8% nickel sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot Strip	19c	20.5c	23c	28c
Cold Strip	25c	26.5c	29c	34c

Carbon 0.12 and under; no nickel. A has chrome 15% and under. B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Steel Plates

Pittsburgh, base	1.50c to 1.60c
New York, del.	1.60c to 1.70c
Phila., del.	1.49½ to 1.59½
Boston, del.	1.72c to 1.82c
Buffalo, del.	1.85½c
Chicago, base	1.70c
Cleveland, del.	1.80½c
Birmingham, base	1.75c
Coatesville, base	1.40c to 1.50c
Pacific Coast, c.i.f.	1.75c
St. Louis, del.	1.94c

Structural Shapes

Pittsburgh, base	1.60c
Philadelphia, del.	1.65c to 1.75c
New York, del.	1.77c to 1.87c
Boston, del.	1.90½c to 2.00½c
Chicago, base	1.70c
Cleveland, del.	1.80½c
Lackawan., base	1.70c
Birmingham, base	1.75c
Pacific Coast, c.i.f.	2.10c
Do., wide flange	2.20c

Bars

SOFT STEEL

Pittsburgh, base	1.60c
Chicago, base	1.70c
Birmingham, base	1.75c
Lackawan., base	1.70c
Pacific Coast, c.i.f.	2.00c
Cleveland, base	1.65c
Philadelphia, del.	1.91c
New York, del.	1.95c
Boston, del.	2.02c
Pitts., cold finish	1.70c
Pitts., forg. qual.	1.75c and 1.85c
San Fran., c.i.f.	2.10c

RAIL STEEL

Pitts., Buff., St. Louis	1.30c
Chicago, base	1.50c
Eastern mills	1.30c

IRON

Chicago, base	1.60c to 1.65c
New York, del.	1.85c to 1.90c
Philadelphia, del.	1.81c to 1.86c
Pitts., refined	2.70c to 4.20c

REINFORCING

New billet steel, Chi., Pitts., Buff., Cleve., Birm. (cut lengths)	1.55c
Chicago, rail steel	1.30c
Phila., cut lengths	1.86c

Wire Products

(Prices apply on carload lots. Mixed carloads 10 cents higher with 10% discount off extras; joint carloads 10 cents higher with no discount from extras; pool carloads 20 cents up; less carloads 30 cents up.)

F.o.b. mills, 100 lb. keg

Standard wire nails	$1.85
Cement coated nails	1.85
Galvanized nails	3.35

(Per pound)

Polished staples	2.55c
Galvanized fence staples	2.80c
Barbed wire, gal.	2.35c
Annealed fence wire	2.25c
Galvanized wire	2.60c
Woven wire fencing (base column, c.l.)	$50.00

(To Manufacturing Trade)

Plain wire, 6-9 ga.	2.10c
Spring wire	3.10c

Anderson, Ind., $1 over Pitts.-Cleve.; Chicago, Duluth and Worcester, $2 higher; Fairfield, Ala., $3 higher.

Cold-Finished Bars

Base Pitts., one size, shape, grade, shipment at one time to one destination

10,000 to 19,999 lbs.	1.70c
20,000 to 59,999 lbs	1.65c
60,000 to 99,999 lbs.	1.60c
100,000 lbs. and over	1.57½c

Chicago, Cleveland, Buffalo 5c higher; Detroit, 20c; eastern Michigan 25c.

Shafting

Cumberland, Md., base

1⅛-inch	3.00c
1⅞ to 1½-inch	2.50c
1⅞ to 1⅞-inch	2.20c
2⅛ to 6-inch	2.05c

Alloy Steel

Hot rolled, f.o.b. Pittsburgh, Buffalo, Chicago and Massillon, O. Base 2.45c to 2.65c. Differentials to various classes of consumers.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	3100	0.55
2100	0.55	3200	1.35
2300	1.50	3300	3.30
2500	2.25	3400	3.20

4100 .15 to .25 Mo.	0.50
4600 .20 to .30 Mo.	1.25-1.75
Ni.	1.05
5100 .80-1.10 Cr.	0.45
5100 Cr. spring	0.20
6100 bars	1.20
6100 spring	0.95
Cr., Ni., Van.	1.50
Carbon van.	0.95
9250 (flats)	0.25
9250 (rds., sq.)	0.50

Strip, Hoops, Bands

Hot-rolled strip up to 23 15/16-in. wide, Pitts.	1.55c
Do., Chicago	1.65c
Do., del. Phila.	1.86c
Do., del. N. Y.	1.90c
Cooperage hoop, Pittsburgh	1.65c
Do., Chicago	1.65c to 1.75c
Cold-rolled strip, Pitts., Cleve.	1.80c to 2.00c
Worcester, 3 tons or over	2.10c

Rails, Track Material

Stand. rails, mill	$40.00
Relaying rails, Pitts., 20-45 lbs.	$20.00 to 22.00
50 to 75	$16.00 to 18.00
80 to 100	$20.00 to 21.00
Light rails, 25-45, mills	$30.00
Light rails, Chi.	$32.00
Angle bars, mills	2.55c
Spikes, R. R. mills	2.15c
Spikes, boat, b'ge, Pitts.	2.65c
Track bolts, Chi.	3.50c
Do., stand., job.	73 off list
Tie plates, Pitts.	$35.00
Tie plates, Chi.	$35.00

Rivets, Wrought Washers

Struc., c.l., Pitts.-Cleve.	2.25c
Struc., c.l., Chi.	2.35c
7/16-in. & smaller, Pitts., Chi., Cleve.	70, 10 and 10 off
Washers, c.l., Pitts. dist.	6.50 to 6.75 off
Do., Chi. dist.	7.25 to 7.00 off

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chi. Discounts to legitimate jobbing or large consuming trade for full-case lots, Dec. 1, 1932, lists.

CARRIAGE BOLTS

All sizes, cut thread	75 off
Rolled thread ½ x 6 and smaller	75 off
Eagle list	75 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts	75 off
Tire bolts	60 and 10 off
Stove bolts, 75, 25 and 10 off in pkgs.; 86 off in bulk, 5000 or more of a size.	
Rolled thread machine bolts, ½ x 6 and smaller	75 off.

NUTS

Semifinished	75 off

HEXAGON CAP SCREWS

Milled	85 off
Upset 1-in. diam., smaller	85-10 off

SQUARE HEAD SET SCREWS

Upset, 1-in., smaller	80 off
Upset, larger than 1-in.	80 off
Headless set screws	75-10 off

Cut Nails, Piling

Cut nails, c.l., Pitts.	$2.50
Do., less carloads, 5 kegs or over	$2.90

Steel piling, Pitts. 1.90c to 1.95c

Pipe and Tubing

Base $200 net ton, except on standard commercial seamless boiler tubes under 2 inches and cold drawn seamless tubing.

Welded Iron, Steel Pipe

Base discounts on steel pipe, Pittsburgh and Lorain, O., to consumers in carloads, Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago delivered, 2½ points less. Wrought pipe, Pittsburgh base.

All discounts are net.

BUTT WELD
Steel

In.	Blk.	Gal.
¼ and ⅜	60½	42
½	65½	54
¾	69	59
1—3	71	62

Iron

½	31½	15
¾	36½	20½
1—1¼	39½	25½
2	41½	26

LAP WELD
Steel

2	66	57
2½ to 6	69½	60½
7 and 8	68	58
9 and 10	67	57
11 and 12	66	56

Iron

2	37	22½
2½—3½	38	25
4—8	40	28½
9—12	38	24½

(Please turn to next page)

LINE PIPE

Steel

⅛-inch, butt weld	54
¼—⅜, butt weld	59½
½, butt weld	64½
¾, butt weld	68
1—3, butt weld	70
2-inch, lap weld	65
2½—6, lap weld	68½
7—8, lap weld	67
9—10, lap weld	66
11—12, lap weld	65

Iron

⅛—1½ inch, black and galv. take 4 pts. over; 2½—6 inch 2 pts. over discounts for same sizes, standard pipe list. 8—12 inch no extra. 2-inch line discount unchanged from list prior to April 15, 1933.

BOILER TUBES

C. L. Discounts, f.o.b., Pitts.

Lap Welded Steel		*Charcoal Iron*	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¾—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Quantity discounts, same as for hot rolled below. Charcoal Iron—Under 10,000 pounds; 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

Cold Drawn

1 inch	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

Hot Rolled

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Quantity discounts are: Under 10,000 pounds, 10 points and 5 per cent; 10,000 to 24,999 pounds, 6 points and 5 per cent; 25,000 pounds to carload, 2 points and 5 and 5 per cent; carload and over, base discount and 5 and 5 per cent. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount.

Seamless Tubing □

Cold drawn; f.o.b. mill disc.

100 ft. or 150 lbs. 40%
15,000 ft. or 22,500 lbs. 70%

Cast Iron Water Pipe □

Class B Pipe—Per Net Ton

6-in. & over, Birm.	$32.00-33.00
4-in. Birm.	35.00-36.00
4-in. Chicago	43.40-44.40
6 to 24-in. Chicago	40.40-41.40
6-in. & over, N. Y.	32.00-34.50
4-in. New York	34.50-36.50

Class A pipe $3 over Class B. Stand. fitgs., Birm. base $90.00

Six to 24-inch, fittings, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher.

RAW MATERIAL PRICES

Delivered pig iron prices subject to 10 per cent freight surcharge, maximum 13.44c gross ton, from Jan. 4, 1932, except Buffalo del. at Boston. Asterisk denotes price change.

Pig Iron □ □

Per Gross Ton

FOUNDRY NO. 1

*Chicago, furnace	$16.00
Pitts., dist. fur.	15.00
Pittsburgh, del.	15.63-16.13
Valley furnace	14.50
Cleve. fur., local del.	15.00
Philadelphia, del.	15.26
Virginia furnace	17.25
Granite City, Ill.	15.50
St. Louis, del.	16.35
Buff., fur., local del.	16.00
Buff., all-rail, Bost.	19.05
Do, Brooklyn	18.90
Do, Newark	17.28
Ala., Birmingham	12.00
Ala., del. Chicago	16.01
Ala., del. St. Louis	15.85
Ala., del. Cincinnati	15.82
Ala., Phila., dock del.	17.00-17.25
Ala., Balt., dock del.	17.00
Ala., N. Y. dock	17.50
Ala., Bost. dock del.	17.50-17.75
Tenn., Bir. base	13.00
Tenn., del. Cinci.	15.82
Montreal, del.	23.00-23.50
Toronto, del.	22.10

FOUNDRY NO. 2X

Buff., fur., local del.	16.50
Buff., all-rail, Brook.	19.40
Do, Newark	17.78
Buff., all-rail, Bost.	19.55
Virginia furnace	17.75
Eastern, del. Phila.	15.76

FOUNDRY NO. 1X

Buff., fur., local del.	17.50
Eastern, del. Phila.	16.26

MALLEABLE

Valley furnace	14.50
Cleve. fur., loc. del.	15.00
Pittsburgh dis. fur.	15.00
Pittsburgh, del.	15.63-16.13
*Chicago, furnace	16.00
Buff., fur., loc. del.	16.50
Eastern Pa., del.	16.13-18.91
Granite City, fur.	16.00
Montreal, del.	24.00
Toronto, delivered	22.60

BASIC

Pitts., dist. fur.	14.50
Pittsburgh, del.	15.13-15.63
Eastern Pa., del.	15.00-15.25
Buff., fur., loc. del.	15.50-16.00
Montreal, del.	23.50
Valley, furnace	14.00

BESSEMER

Valley furnace	15.00
Pittsburgh fur.	15.50
Pittsburgh, del.	16.13-16.63

LOW PHOS.

Valley fur. stand.	23.00-24.00
*Phila., standard	22.76-26.79
Copper bear., E. Pa. furnace	22.00-23.00

GRAY FORGE

Valley furnace	14.50
Pitts. dist. fur.	15.00
Pittsburgh, del.	15.63-16.13

CHARCOAL

Lake Sup., del. Chi.	23.04

SILVERY

Jackson County, O., fur. 7%—$18.50; 8—$19; 9—$19.50; 10—$20; 11—$21; 12—$22; 13—$23; 14—$24; 15—$25; 16—$26 17—$27.

Pittsburgh and Buffalo furnace; 7 to 10—$19; 15—$21 to $23.

BESSEMER FERROSILICON

Jackson County, O., fur., 10%—$20.50; 11—$21; 12—$21.50; 13—$22.50; 14—$23.50; 15—$24; 16—$25; 17—$26.50.

Iron Ore □ □

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bess.	$4.30
Mesabi bessemer	4.65
Old range nonbess.	4.65
Mesabi nonbess.	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents, unit, del. E. Pa.

Foundry and basic, 56-63%, con. (nom.)	7.50
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per unit, f.a.s. Atlantic ports (nom.)

Foreign manganiferous ore, 45-55% iron, 6-10% man.	8.00
No. Afr. low phos.	7.00
Swedish basic, 65%	7.50- 8.00
Swedish low phos.	8.00
Spanish, No. Afr. basic, 50 to 60%	7.00
Tungsten, spot, sh. ton unit, duty pd.	$9.65- 9.90
N. F. fdy., 55%	7.00
Chrome ore, 48% gross ton c.i.f.	$15.50-16.50

Manganese Ore □

(Nominal)

Prices, not including duty, cents per unit, cargo lots.

Caucasian, 52-55%	nominal
So. African, 52%	18 to 19 cts.
So. Afr., 49-51%	nominal
Indian, 48-50%	nominal

Refractories □ □

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pa., Ohio, Ill., Ky., Md., Ga., Ala.	$35.00
Missouri	35.00

Second Quality

Pa., O., Ill., Ky., Md.	30.00
Missouri	30.00
Georgia, Alabama	30.00

MALLEABLE BUNG BRICK

All bases	40.00

SILICA BRICK

Pennsylvania	$35.00
Joliet, E. Chicago	47.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton, 9 x 4½ x 2½

*Burned	$65.00
Unburned	52.00

CHROME BRICK

Per Net Ton

*F.o.b. ship. point	$45.00

MAGNESITE

*Dead burned grain, Chester, Pa., Baltimore bases, net	45.00
*Domes, Chewelah, Wash., base	22.00

Fluorspar □ □

85 to 5 per cent grade

Washed gravel, f.o.b. Ill., Ky., net ton, carloads	$11.50
Washed gravel, import duty paid tide, gross ton	$17.50

Semifinished Steel □

Prices Per Gross Ton

BILLETS AND BLOOMS

4 x 4-inch base

Pitts., Chi., Cleve., open-hth. & bess.	$26.00
Philadelphia	31.75
Forging, Pitts., Chi.	31.00

SHEET BARS

Pitts., Cleve., Yong.	26.00
Chicago	26.00

SLABS

Pitts., Cleve., Yong.	26.00

WIRE RODS

Pitts., Cleveland	$35.00
Chicago	36.00

SKELP

All grades, Pitts.	1.50c-1.60c

Coke □ □

Price Per Net Ton

BEEHIVE OVENS

Connellsville fur.	$1.75
Connellsville fdry.	2.25- 2.50
Connell. prem. fdry.	4.00
New River fdry.	6.00
Wise county fdry.	4.25- 5.00
Wise county fur.	3.50- 4.25

BY-PRODUCT FOUNDRY

Newark, N. J., del.	8.21- 8.81
Chi. ov., outside del.	7.00
Chicago, del.	7.75
New England, del.	10.00
St. Louis, del.	7.75
Birmingham, ovens	4.00
Indianapolis, del.	7.75
Ashland, Ky., ovens, Connell., basis	4.50
Portsmouth, ovens Connell. basis	4.50
Buffalo, ovens	7.50- 8.00
Detroit, ovens	8.00
Philadelphia, del.	8.50

Ferroalloys □ □

(In dollars, except Ferrochrome)

Ferromanganese, 78-82% tidewater, duty pd.	$68.00
del. Pitts.	73.24
Spiegeleisen, 19-20%, dom., fur., spot†	24.00
Ferrosilicon, 50%, frieght all., c. l.	74.50
Do, less carload	82.50
Do, 75 per cent	120-130.00
Spot, $5 a ton higher.	
Silicomang., 2½ carb.	85.00
2% carbon	90.00
1% carbon	100.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. con. del.	9.50
Do, spot del.	10.00
Ferrotungsten, stand., lb., cont.	0.94- 1.00
Ferrovanadium, 35 to 40%, lb. cont., on analysis	2.60- 2.80
Ferrotitanium, c.l., prod. plant, frt. allow., net ton	137.50
Spot, 1 ton, frt., all., lb.	8.50
Do, under 1 ton	9.00
Ferrophosphorus, per ton, c. l. 17-19%. Rockdale, Tenn., basis; 18%, $2 unitage	50.00
Ferrophosphorus, electrolytic, per ton c. l., 23-26% f.o.b. Anniston, Ala., 24%, $2.75 unitage	65.00
Ferromolybdenum, stand. 50-60%, lb	0.95
Molybdate, lb. cont.	0.80

†Carloads. Diff. to apply to quantity.

Bars

General Buying Holds Rate and Higher Price Is Being Discussed For Third Quarter

BAR PRICES, PAGE 39

Chicago—Steel bar orders are well maintained, still supported principally by automotive demand but to an equal or greater extent by requirements of miscellaneous consumers, who have increased purchases steadily. While the outlook for better consumption by farm implement manufacturers is improved slightly, orders from manufacturers of larger machinery show no increase. A slight gain is noted in demand from makers of small miscellaneous farm equipment. Bar iron buying is in its best volume so far this year, with only occasional small increases noted in railroad purchases. Higher prices for third quarter are regarded as not unlikely, with producers generally unwilling to contract at present levels beyond June.

Pittsburgh—The merchant steel bar base of 1.60c, Pittsburgh, may be advanced before second quarter is completed. The new price is not yet decided upon. In the meantime, specifications are being maintained at a fair rate. The rate of specifications in May has been improving over April.

Cleveland — A wider variety of products are represented in current requirements for steel bars. Commercial forgings, hardware specialties, road and agricultural machinery, are some of the lines for which bar mills here are shipping material. Shears, lamps and bungs for beer barrels are a few of the increasing number of outlets. Automotive requirements, however, continue to dominate tonnage. Bar mills here are operating at approximately 35 per cent. Commercial steel bars are firm at 1.65c, base, Cleveland.

New York—Commercial steel bars are moving more freely, particularly into jobbers' stocks. Higher prices appear in prospect, although how soon is still a question. The current market is 1.60c, Pittsburgh, or 1.95c, New York. Common iron bars are 1.50c, Pittsburgh, or 1.85c, New York.

Philadelphia—Continued increase in buying by jobbers is a feature of the steel bar market here. Manufacturing requirements are also heavier, but lack of railroad buying continues. Higher prices on bars are in prospect before the close of this quarter, according to usually well informed interests. Meanwhile the market is 1.60c, Pittsburgh, or 1.91c, Philadelphia, on steel bars, and 1.50c, Pittsburgh or 1.81c, Philadelphia, on common iron bars.

Tin Plate Releases Heavier; Mills Now at 60 Per Cent

Tin Plate Prices, Page 39

Pittsburgh—With the plants of three independents in this district operating last week at almost 100 per cent and none of the remaining mills at less than 50 per cent, the average of tin mill operations for the week rose 5 points to 60 per cent. Canmakers are issuing heavier releases and are inclined to stock more plate. Several inquiries are expected to develop from Canada shortly. The price holds at $4.25 per base box.

New York—With tin plate sellers refusing to quote beyond June 30, announcement of an advance in prices for the second half now appears imminent. Specifications continue substantial and some producers are falling behind on shipments. Possibility of further delay in shipments this summer due to hot weather retarding output may also tend to strengthen the market.

Cold-Finished Demand Is Well Diversified

Cold Finished Prices, Page 39

Pittsburgh—Miscellaneous buyers of cold-finished steel continue to place requirements and the market is well diversified. No action has been taken on the present base price of 1.70c, Pittsburgh, which continues strong. Many market interests foresee an advance.

Plates

Possible Steel Barge Needs May Require 40,000 Tons of Plates —Sales Are Better

PLATE PRICES, PAGE 39

Pittsburgh—An order for 16 large cargo barges requiring about 3500 tons of plates is expected to develop here soon. The purchaser is located in Pittsburgh. Fully 30 to 35 other barges are considered active, all with prospective Pittsburgh district owners. These would require some 6000 to 7000 tons additional of plates. A survey shows that in all probably 100 barges are being figured up and down the Ohio river. This is in addition to one inquiry alone, reported to be for 60 barges and six towboats. Financing seems to be the stumbling block but should it all go to award, probably 40,000 tons of plates would be required. Most of these barges are to be used for transporting petroleum. Prices show more strength and concessions below 1.50c, Pittsburgh, are fewer. The market ranges 1.50c to 1.60c but it appears likely a minimum of 1.60c will be established shortly. Third quarter plate prices have not been announced. Two derrick boats for St. Louis engineers are expected out soon, each to be 35 x 20 x 4 feet. Tank makers report that inquiry for brewery tanks is decidedly more active. Midland Barge Co., Midland, Pa., is delivering two steel barges for the Mobile, Ala., engineers to Tuscaloosa, Ala. Richfield Oil Corp. has awarded 640 tons of plates for gasoline tanks.

Cleveland — Plates, long in a lagging market, are beginning to show more activity. Inquiries are broadening and indicate some substantial business shortly. Plates are wanted in connection with oil and refinery work, gas machinery installations, and for general engineering purposes. An inquiry from a manufacturer of gas machinery is for 200 to 300 tons. Pere Marquette railroad has purchased 225 tons for repair purposes. The Elyria, O., plant making beer tanks continues to take material. The market here is firmer at 1.60c, base, Pittsburgh. Some of the extremely low prices done recently in the East, frequently pointed to by buyers here, are being canceled.

Conneaut, O., will take bids May 20 on a 500,000-gallon elevated tank, and 1900 feet of 24-inch pipe, requiring a total of approximately 300 tons of plates.

New York—Leading platemakers are refusing to quote beyond June 1, with an advance likely to be announced soon. Tank work features plate demand. Breweries and fuel oil burner manufacturers are active,

the season for the latter now getting under way. With $40,000,000 to $50,000,000 naval construction included in the $3,000,000,000 work program of government, shipyards buying is brought nearer. Some naval ship specifications are expected out within a month.

Chicago—Plate orders from miscellaneous consumers are in fairly steady volume, with no large orders. Inquiry for tank work is moderately more active, although recent awards have been small. Railroads and car builders are poor buyers.

Boston—For tanks at Chelsea, Mass., 520 tons have been awarded, largest in months, Chicago Bridge & Iron Works, Chicago, to fabricate the material. Demand for small lots holds well. Prices range from 1.40c to 1.50c, Coatesville, Pa., on ordinary tonnages.

Philadelphia—Fabrication contract for gas holders for the Philadelphia Gas Co. is reported placed with a Pittsburgh shop. Approximately 3500 tons of plates and shapes will be required. Miscellaneous requirements make most of current business, which show some improvement from a week ago. Prices appear stronger at 1.40c, Coatesville, Pa., with indications pointing to higher quotations soon.

Contracts Placed

4200 tons, 78-inch welded steel pipe, 5/16-inch plates, Cedar River pipe lines No. 1 and 2, Seattle, to Puget Sound Machinery Depot, Seattle.

640 tons, gasoline storage tanks, Richfield Oil Co., Providence, R. I., Rochester and Syracuse, N. Y., to Steel Fabricating Co. of Muskegon, Muskegon, Mich.

520 tons, eight fuel tanks, combined capacity 5,000,000 gallons, Jenney Mfg. Co., Marginal street, Chelsea, Mass., to Chicago Bridge & Iron Works, Chicago.

200 tons, three 300,000-gallon tanks Metropolitan Water District, Los Angeles, to Western Pipe & Steel Co., Los Angeles.

130 tons, tanks, W. H. Daugherty & Son Refining Co., Petrolia, Pa., to Warren City Tank & Boiler Co., Warren, O.

100 tons, bureau of supplies and accounts, navy department, Washington, for Mare Island, Calif., to John T. Hill, Baltimore.

Contracts Pending

40,000 to 45,000 tons, aggregate estimated tonnage, for approximately 160 Ohio river barges presently considered active in the Pittsburgh district, sponsored by numerous private concerns; barges to be used mainly for oil transportation.

5860 tons, Pine Canyon dam pipe line, Pasadena; bids soon.

4125 tons, Bouquet canyon penstock, Los Angeles; bids soon.

500 tons, for repair of oil tanker; by Robins Drydock & Repair Co., Brooklyn, N. Y.

300 tons, approximate, 500,000-gallon water tank and 1900 feet of 24-inch pipe, Conneaut, O.; bids May 20.

Unstated tonnage, floating equipment for the Mississippi and Missouri rivers, St. Louis federal engineers. Specifications to include two derrick boats, 35 x 20 x 4 feet.

Unstated tonnage, casings and steel stacks, central power plant, submarine base, New London, Conn.; B. F. Sturtevant Co., Boston, low.

Strip

Mills Busier on Heavier Sales; Cold-Rolled Advance Planned

Strip Prices, Page 39

Pittsburgh—Strip steel production in this district is better than 30 per cent of capacity. The entire market, with the exception of cold-rolled strip, is strong. Hot-rolled at 1.55c, Pittsburgh, has established the recent $2 a ton advance. Cold-rolled strip base price is indefinite and no action has been taken on a proposed advance. Present prices for hot-rolled do not include specifications entered after June 30. In May and April, strip orders have been better each week than in the entire month of March.

Cleveland—Strip steel mills are accumulating backlogs for the first time in many months. Deliveries cannot be given as promptly as formerly. Consumers, especially automotive, are anticipating requirements farther ahead. Lack of building operations here is restricting demand from this source, normally heavy. Hot-rolled strip holds at 1.55c, base Pittsburgh; and though an advance in cold-rolled is contemplated by some mills, the current price remains 1.80c to 2.00c, base, Cleveland.

Chicago—Strip orders are well maintained. Automotive orders are steady and although small lots predominate in specifications from smaller consumers, the number has increased gradually. Cold-rolled strip prices continue rather unsteady, generally around 1.80c, Pittsburgh-Cleveland, with some higher prices prevailing. Hot-rolled strip holds at 1.65c, Chicago.

Philadelphia—Strip buying is expanding, with radio manufacturers taking a better tonnage. Most hot-strip business is under contract at levels below 1.55c, Pittsburgh. Cold-rolled is moving generally at 1.80c to 1.90c, Pittsburgh, or 2.11c to 2.21c, Philadelphia.

Boston—Cold-rolled strip producers in New England will take new business for the remainder of the second quarter only at 2.10c, Worcester, freely predicting an advance on third quarter contracts. Meanwhile district mills are refusing volume under the present top price. Demand for strip has materially increased, practically all producers reporting better buying.

New York — Movement of strip steel has improved materially, particularly because of increased production of hardware. Continued good automobile production is affecting both hot and cold-rolled materials. Prices are unchanged at 1.55c, Pittsburgh, on hot strip, and 1.80c to 1.90c, Pittsburgh, on cold. The Pittsburgh to New York rate is 35 cents. Deliveries are being pushed ahead slightly.

Railroads

Pennsylvania Divides 20,000 Tons Rails—Demand Quiet

Track Material Prices, Page 39

Distribution of about 20,000 tons of steel rails by the Pennsylvania will start rail mills at Chicago, Pittsburgh and in the East. The tonnage was divided between Carnegie Steel Co., Bethlehem Steel Co., Illinois Steel Co. and Inland Steel Co. About 9000 tons go to the Pittsburgh mill, in 131 and 152-pound sections, mainly the former. Reports as to the New York Central's rail needs conflict, one stating it may place 12,000 tons soon and another that 7000 to 9000 tons will not be released for some time.

Steel buying for repair purposes is desultory and makes a small aggregate. Track fastenings are also in light demand, though at Chicago mills are receiving releases on a fair volume. The Pere Marquette railroad has placed 225 tons of plates for car repairs. At Chicago manufacturers of frogs and switches find their orders are improving somewhat.

Prices on all materials used by railroads are steady and no changes have been made.

Car Orders Placed

British American Oil Co., fifty 40-ton tank cars, to National Steel Car Corp. Ltd., Hamilton, Ont.

Rail Orders Placed

Pennsylvania, 20,000 tons 131 and 152-pound sections, divided among Carnegie Steel Co., Pittsburgh, Illinois Steel Co. and Inland Steel Co., Chi-

cago, and Bethlehem Steel Co., Bethlehem, Pa.

Car Orders Pending

International Harvester Co., Chicago, repairs three hopper cars; bids asked.
Procter & Gamble Co., Cincinnati, five aluminum tanks of 8000 gallons, for tank cars; pending.

Wire

Improved Sales Continue With Price Advance Delayed

Wire Prices, Page 39

Pittsburgh—It becomes apparent that wire prices will not be advanced until at least third quarter. However, third quarter books will be opened within another two weeks. Currently, Pittsburgh bases of 2.10c on plain wire; $1.85 on standard wire nails and $50 for woven fence are strong. May specifications are even better than April, jobbers leading in buying.

Cleveland—Steady improvement is noted in demand for wire and wire products. May shipments will exceed those of April. The tonnage booked in the first quarter, it develops, was substantially larger than in the comparable period last year. Manufacturers' requirements show a broadening tendency. A gain also is reported in sales of fencing. Prices are firm.

Chicago—Improvement in wire demand has been consistent and current activity is the best since 1931. While movement of material from distributors in agricultural districts is retarded by seasonal factors, mill shipments show moderate gains. Requirements for manufacturers' wire have increased steadily, with automotive consumption well maintained. Prices show a fairly steady tone with no intimation of an early advance. Producers usually are averse to contracting beyond second quarter at present prices.

Worcester, Mass.—Whitney Blake Co., New Haven, Conn., will draw 4100 miles of fine 7-strand signal wire, five steel and two copper strands, for field telephone service, army base Brooklyn, N. Y., Graybar Electric Co. taking the contract at $18.93 a mile, f.o.b. works, and 100 miles at $20.85, f.o.b. works, a total of $77,805. New England wire mills are generally holding the recent steady increase in volume with prices firm, plain wire at 2.20c, Worcester.

Pacific Northwest Power Co., Portland, Oreg., has changed its name to Portland Electric Power Co.

Pipe

Eastern Cast Prices Stronger—2200 Tons Placed for Connecticut Project—Gas Line Pending

PIPE PRICES, PAGE 39

New York—Eastern cast pipe foundries are attempting to advance prices to $33, eastern foundry, but this price has not been subjected to much test on new bidding. Inquiry is light. About 2200 tons of 20-inch for a water line, Stamford-Greenwich, Conn., is reported placed.

The Lycoming Gas Co. here is inquiring for 1200 tons of steel pipe 8⅝ inches to 10¾ inches for installation upstate.

Pittsburgh—In the tubular products market practically no change is noted in orders or inquiries as compared to a month to six weeks ago. There are no promising line pipe inquiries out, and the movement of oil country goods continues restricted. Standard pipe still is moving slowly to jobbers. Current discounts are well held.

Chicago — Springfield, Ill., has placed 1500 tons of 30-inch cast pipe, the largest order booked in this district recently. Among other small purchases is one for 125 tons of fittings for Ft. Wayne, Ind. Holding of spring elections is seen as a retarding influence in inauguration of new public work, with prospects for future months regarded as moderately favorable. Prices are fairly steady.

Boston—Cast pipe inquiry is heavier with several New England cities about to enter the market for substantial tonnages. Springfield, Mass., will take bids on 300 tons. Cast pipe prices are steadier.

Birmingham, Ala.—While several awards are in prospect, pipe foundry operations have shown no improvement. Readjustment of operating forces has been necessary with more than one company here.

Cast Pipe Placed

1500 tons, 30-inch, Springfield, Ill., to Lynchburg Foundry Co., Lynchburg, Va.
800 tons, 24-inch, New Rochelle Water Co., New Rochelle, N. Y., to United States Pipe & Foundry Co., Burlington, N. J.
400 tons, 10-inch, Pawling, N. Y., to Donaldson Iron Co., Emaus, Pa.
180 tons, hospital water line, Thiells, N. Y., to Donaldson Iron Co., Emaus, Pa.
125 tons, fittings, Ft. Wayne, Ind., to Lynchburg Foundry Co., Lynchburg, Va.

Steel Pipe Placed

Unstated tonnage, 74,600 feet, up to 12-inch, but mainly small sizes, galvanized, wrought iron or steel, Panama, to Youngstown Sheet & Tube Co., Youngstown, O., $8956.24; bids April 28, schedule 2858.

Cast Pipe Pending

300 tons, 6 to 12-inch, Springfield, Mass.; bids May 22.
300 tons, 6 and 8-inch, Holland, N. Y.
300 tons, Ridgewood, N. J.; R. D. Wood & Co., Florence, N. J., low.
200 tons, 8 to 12-inch, Saratoga, N. Y.
200 tons, 6 and 8-inch, Dobbs Ferry, N. Y.

Steel Pipe Pending

1200 tons, 8⅝ inches to 10¾ inches, for Lycoming Gas Co., New York, for installation in New York state.

Bolt, Nut Gains Moderate; Large Users Delay Buying

Bolt, Nut, Rivet Prices, Page 39

Gains in sales of bolts, nuts and rivets continue steadily, but at a slow rate. Smaller buyers contribute more to the increase than do the larger users, railroads and agricultural implement builders. Automotive consumers are taking considerable tonnage.

Cleveland producers find sales well ahead of those of last month. At Chicago and Pittsburgh the gain is less marked. Third quarter prices are expected in two or three weeks. Present prices are steady at 75 off list for bolts; structural rivets are 2.25c, Pittsburgh, and 2.35c, Chicago.

Bayley Blower Co., 1938 South Fourth street, Milwaukee, manufacturing air conditioning equipment, fans, etc., organized several months ago to take over the assets of a concern of similar name, has moved to larger quarters at 1817 South Sixty-fourth street, West Allis, Wis. When in normal production a staff of 50 will be maintained. Officers of the new company are: President, Eugene Worthing; vice-president and general manager, Ernest Szekely; secretary and treasurer, Erwin Brandt.

Structural Shapes

Awards Still Light, With Little Public Work in Immediate Prospect—6000 Tons Additional Placed for San Francisco Bridge—2000 Up for Missouri River Structure

STRUCTURAL SHAPE PRICES, PAGE 39

Pittsburgh—A Pennsylvania state letting May 26 includes a 330-ton three-span structural steel bridge between Lehigh and Northampton counties, and a 156-ton bridge in Cumberland county. For the Nashville, Tenn., postoffice, 1390 tons have been placed with a Nashville fabricator. Plain material generally is quoted 1.60c, Pittsburgh.

Cleveland—A better feeling is noted in the market for structural shapes, and small fabricating shops report an increase in the number of jobs. Substantial projects, however, are lacking here. Fabricators figured 1600 tons of shapes for an Erie railroad bridge, Elmira, N. Y., bids for which went in May 11. Plain material holds at 1.60c, base, Pittsburgh.

Chicago—Improvement in number of structural shape inquiries has yet to be accompanied by a gain in the tonnage involved, with the majority of prospective projects requiring lots of less than 100 tons. Inquiries from the International Harvester Co. for 700 tons for a plant at East Moline, Ill., and 250 tons for a building for the Chicago Carton Co. here are outstanding among private works. Mississippi highway bridges will take 900 tons.

Boston — Several hundred tons have been placed or are active in the Providence, R. I., district. A state bridge in New Hampshire will take a substantial tonnage.

New York—Pending development of the federal government public works program, structural activity shows little change. Buying is light, although there is some slight gain in small projects. New inquiry includes 1500 tons for a New York state school. Low bid on inspection of structural steel for the appraisers' store, Baltimore, is 8c a ton. Plain material is steady at 1.60c, Pittsburgh.

Philadelphia — Structural buying has improved with the placing of three contracts ranging from 100 tons to more than 450. New inquiry is light, and includes a fair tonnage for state bridge work near Allentown, Pa., on which contractors bids are to be opened May 26. Standard shape prices are unchanged at 1.60c, nearest mill, or 1.65c, Philadelphia.

Contracts Placed

4225 tons, additional, East bay superstructure, San Francisco-Oakland bridge, San Francisco, to Columbia Steel Co., San Francisco.

1695 tons, additional, West bay superstructure, San Francisco-Oakland bridge, San Francisco, to Columbia Steel Co., San Francisco.

1390 tons, postoffice, Nashville, Tenn., to Nashville Bridge Co., Nashville, Tenn.; through Frank Messer, Cincinnati, general contractor.

470 tons, monastery, Villa Nova college, Villa Nova, Pa., to Shoemaker Bridge Co., Pottstown, Pa.

367 tons, state bridges, Harrison county, Missouri, to St. Joseph Structural Co., St. Joseph, Mo.

240 tons, tower line, Connecticut Light & Power Co., to Blaw-Knox Co., Pittsburgh.

220 tons, Miller Memorial hospital, Duluth, Minn., to American Bridge Co., Pittsburgh.

200 tons, state bridges, Glade and Columbia counties, Florida, to Virginia Bridge & Iron Co., Roanoke, Va.

160 tons, two spans, Middle Oconee river, Seaboard Air Line railroad, to Virginia Bridge & Iron Co., Roanoke, Va.

150 tons, structural steel and steel castings, miscellaneous work for lock and dam No. 3, Tennessee river, to Midland Barge Co., Midland, Pa.

140 tons, miscellaneous structurals, Lehigh Navigation Co., Coaldale, Pa., to American Bridge Co., Pittsburgh.

132 tons, bridge, Stoner Creek, Kentucky, to American Bridge Co., Pittsburgh.

120 tons, cell block, United States reformatory, El Reno, Okla., to Capitol Steel & Iron Co., Oklahoma City; Murch Bros., St. Louis, general contractors.

105 tons, Beaver dam bridge, Ocean county, New Jersey, to American Bridge Co., Pittsburgh; through Gray Construction Co.

100 tons, or more, hospital, Providence, R. I., to Bethlehem Fabricators Inc., Bethlehem, Pa.; J. W. Bishop, Providence, general contractor. G. Fred Swanson, Providence, awarded reinforcing bars.

100 tons, bakery, Providence, R. I., to Lehigh Structural Steel Co., Allentown, Pa.

100 tons, Trainer brewery, Philadelphia, to Belmont Iron Works, that city.

100 tons, bridge beams, Primghar, Idaho, to Des Moines Steel Co., Des Moines, Iowa.

Shape Awards Compared

	Tons
Week ended May 13	10,015
Week ended May 6	*125,675
Week ended April 29	7,405
This week in 1932	5,549
Weekly average, 1932	14,285
Weekly average, 1933	15,812
Weekly average, April	8,912
Total to date, 1932	269,725
Total to date, 1933	316,249

*Revised

Contracts Pending

2000 tons, Missouri river bridge, Kansas City, Mo., for Regional Bridge Corp.

1600 tons, bridge, Erie railroad, Elmira, N. Y.; bids May 11.

1500 tons, state vocational institution buildings, Coxsackie, N. Y.; bids May 18 at Albany, N. Y.

900 tons, highway bridges, Mississippi.

743 tons, jail, San Francisco; bids opened.

700 tons, building, International Harvester Co., East Moline, Ill.

400 tons, piling, bulkhead, Calvert county, Maryland; Smith Bros., Galesville, Md., low.

350 tons, passenger station, Miami, Fla., for Pan American Airways.

330 tons, three-span 640-foot state highway bridge, North Whitehall and Lehigh townships between Lehigh and Northampton counties, Pennsylvania. Bids to department of highways, Harrisburg, Pa., May 26.

279 tons, three bridges, Ramona blvd., Los Angeles; plans completed.

260 tons, outlet tunnel, San Gabriel dam No. 1, Los Angeles; Concrete Engineering Co., Los Angeles, low.

260 tons, garage, West Chelsea Construction Co., New York.

250 tons, building, Chicago Carton Co., Chicago.

250 tons, bridge, Seneca, Ill.

203 tons, San Gabriel dam No. 2, Los Angeles; bids May 10.

200 tons, newspaper plant, Providence, R. I.

160 tons, building, Krug Bakery Co., Jamaica, N. Y.

156 tons, railroad bridge over highway, East Pennsboro township, Cumberland county, Pennsylvania; bids to department of highways, Harrisburg, Pa., May 26. Reinforced concrete box culvert to take 67 tons of plain steel bars.

Unstated tonnage, state bridge work, near Allentown, Pa.; bids May 26.

Worthington Pump & Machinery Corp. and Gamon Meter Co. have consolidated their operations in manufacture and sale of meters in the Worthington-Gamon Meter Co., with sales headquarters at Harrison, N. J. Manufacturing will be concentrated in the Gamon plant at Newark, N. J. E. T. Fishwick is president, G. H. Gleeson vice president in charge of sales, J. A. Bonnet secretary, and R. R. Anderson works manager.

Concrete Bars

Price Advanced $4 a Ton in New York District—Pittsburgh Market Stronger, With Continuing Rise in Specifications — 5000 Tons Additional Placed in West

REINFORCING BAR PRICES, PAGE 39

New York—Price advances of $4 a ton, effective this week, have been made on concrete bars by several mills with others expected to follow. Inquiry is slightly heavier with bids in on several hundred tons for New York state highways and bridges. More work also is coming out for future bidding. Awards include 400 tons for prison buildings at Dannemora, N. Y.

Philadelphia—The market continues dull. No orders of consequence have been placed, and with the exception of 600 tons for the proposed Pennsylvania pier in Baltimore, none is in immediate prospect. An advance of $4 per ton in concrete bars announced effective May 15 brings the Philadelphia price to 2.06c, delivered, for cut lengths. The former prices definitely under negotiation will be effective until June 1.

Pittsburgh—The price of 1.55c, all basing points, for cut lengths of new billet steel bars is considerably stronger, and an advance is expected. This would advance the present price of 1.40c to distributors. Action may be taken before commitments are made for third quarter. New billet bar specifications have been running much heavier and represent more widely diversified buying. A Pennsylvania state letting, May 26, includes several lots of reinforcing bars, the largest of which is 67 tons in a bridge between Lehigh and Northampton counties.

Cleveland — More jobs requiring concrete bars are in prospect than are actually being figured. For a reservoir in Parma, Cuyahoga county, Ohio, approximately 1000 tons will be required, when bids are taken sometime in June. The same county has a project for improving Settlement road, which will take approximately 100 tons of mesh. The mill price for new billet steel bars to distributors holds at 1.30c to 1.40c, base, Cleveland.

Chicago—Reinforcing bar inquiries usually involve only small lots, one exception being 1000 tons for a building here for the Chicago Carton Co. Road work is providing little business, controversy over cement prices still holding up work in Illinois, while several hundred tons for highway construction in Indiana remains to be placed.

Boston—A few more inquiries are out. For a hospital at Providence, a small tonage has been placed, and a newspaper plant in that city will take about 150 tons.

Contracts Placed

2450 tons, additional, East bay superstructure, San Francisco-Oakland bridge, San Francisco, to Columbia Steel Co., San Francisco.

2572 tons, additional, West bay superstructure, San Francisco-Oakland bridge, San Francisco, to Columbia Steel Co., San Francisco.

445 tons, First street viaduct, Richmond Bridge Corp., Richmond, Va., to Virginia Steel Co., Richmond; J. S. Bowers, Whiteville, N. C., general contractor.

400 tons, buildings, Clinton prison, Dannemora, N. Y., to Milton Mfg. Co., Milton, Pa.; Lowman Construction Co., Elmira, N. Y., general contractor.

150 tons, rebuilding municipal ferry viaduct, St. George, Staten Island, N. Y., to Igoe Bros., Newark, N. J.; Edward Kloberg Inc., New York, general contractor.

100 tons, postoffice, Bloomfield, N. J., and market building in Newark, N. J., to Truscon Steel Co., Youngstown, O.

100 tons, department store, Long Beach, Calif., to unnamed interest.

100 tons, bridge over Stanislaus river, San Joaquin county, California, to unnamed interest.

Contracts Pending

1000 tons, reservoir, Parma, O., for Cuyahoga county; plans being prepared.

1000 tons, building, Chicago Carton Co., Chicago.

350 tons, mesh, state highways, New Hampshire.

200 tons, newspaper plant, Providence, R. I.

163 tons, Harlem, Valley hospital, Wingdale, N. Y.; bids in.

Concrete Awards Compared

	Tons
Week ended May 13	6,317
Week ended May 6	7,578
Week ended April 29	3,974
This week, 1932	5,248
Weekly average, 1932	3,920
Weekly average, 1933	3,563
Weekly average, April	2,169
Total to date, 1932	90,202
Total to date, 1933	71,278

Price Advance Indicated for Sheet Bars, Billets, Slabs

Semifinished Prices, Page 40

Sheet bars, billets and slabs will be advanced $2 a ton for the third quarter, according to present indications. One nonintegrated strip steel roller is reported to have been informed of such an advance on billets. In the meantime, sheet bars, billets and slabs are firm at $26, Pittsburgh, Youngstown, and Cleveland. Forging shops are taking more forging quality billets, with the price $31, Pittsburgh. Wire rods are stronger at $35, Pittsburgh.

Coke

Users Taking Contracts to End of Year—Sales Larger

Coke Prices, Page 40

Interest in coke coverage to the year-end is increasing and some contracts have been made for that period, especially in furnace grades. In the Pittsburgh district foundry beehive coke is dull. Increasing foundry activity in the Chicago and St. Louis districts has resulted in better demand and May sales indicate an increase over April.

In the New York area while indications point to higher prices for metallurgical coke for second half the announcement is not expected as early as usual as producers wish full opportunity to appraise the situation before committing themselves.

Prices have not been changed on furnace and foundry grades, $2.25 and $4, Connellsville, applying to common and premium grades of foundry, and $1.75, Connellsville, to furnace coke.

Ferroalloys More Active

Ferroalloy Prices, Page 40

Ferroalloy specifications are expanding, a movement that is expected to continue for the present, because of possible higher prices for the second half and prospects for further steel consumption. The current market is $68, Atlantic seaboard, on shipments to July 1. Spot domestic spiegeleisen, 19 to 21 per cent, is steady at $24, furnace, with contracts subject to individual negotiations.

Partnership of U.S.-Industry Near

(*Concluded from Page* 12)

Case, president, Lamson & Sessions Co., and C. Edwin Michael, president, Virginia Bridge & Iron Co., have been acting with the association.

So mobile are the various attacks upon the depression that any plan may be changed overnight, but the approval by the President last Friday of the rough draft of the industrial recovery bill, coupled with a public works appropriation gives every indication of its consummation. There has, however, been no hesitancy on the part of the President to abandon a position when it has been rendered untenable by an adverse reaction. This was the case with the 30-hour bill, which was reported favorably back to the house Thursday, following its passage by the senate. But the 30-hour bill is believed to have been buried under the weight of the new control measure.

There is no lack of observation in Washington that the proposed government control of industry is a complete retreat from Jeffersonian principles and that the new deal for industry will be a "noble experiment" indeed.

□ □ □

Coupled with control of industry in the same measure is a public works program, expected to approximate $3,300,000,000.

In the senate, sentiment for a large public works program has been smoldering for several years. Last week the Cutting-Costigan-Lafollette bill appropriating $6,000,000,000 was introduced, largely apparently to effect a compromise more nearly acceptable to the planners than to the budget balancers.

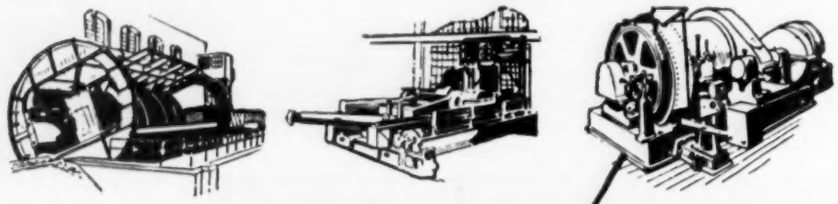
To what extent iron and steel will benefit from the public works proposal is undetermined and no estimate of tonnage is available, but it will be large. A tendency toward lower costs and secondary roads may somewhat lessen the requirements for iron and steel.

The President and his advisers are anxious to throw into the breach those public works which can be initiated with the least preliminary work, and this puts highways next to the post. Highway work is also favored because of the amount of hand labor possible.

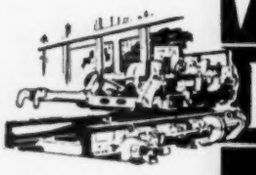
In a year it is believed that the states could put under contract highways costing $500,000,000, with counties and cities each in position to match 70 per cent of this. But highways have stiff competitors in slum clearance, grade separations, national parks and war department projects.

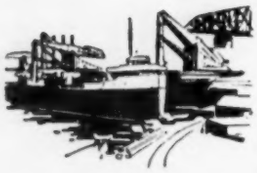
A federal administrator of public works is regarded as certain. While advocates of various types of construction are playing a lone game, they are unanimous for earmarking the appropriation because failure to do so would continue the contest between these groups and place the administrator in an impossible situation.

A third facet to the bill will be a new form of taxation to raise the required billions. This may prolong discussion of the measure in congress and may also compel its introduction in the house, where the opposition may be the greatest. But the President has not yet failed to get any measure behind which he put his strength.



WELLMAN MACHINERY FOR IRON AND STEEL PRODUCTION





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Pig Iron

Foundry, Malleable Grades Up 50 Cents; Sales, Shipments Continue Gain in Middle West

PIG IRON PRICES, PAGE 40

Pittsburgh—Foundry melt is improving and both orders and shipments in the merchant iron market are heavier. There is also a better volume of inquiries. However, scrap continues to make inroads on foundry requirements. An example was a sale recently of several thousand tons of No. 1 cupola cast scrap at $10.50 to a Uniontown, Pa., melter. This price obviously is some $3 under foundry pig iron at $15, Pittsburgh district furnace. Pittsburgh Plate Glass Co., has purchased 500 tons of foundry iron for its Ford City, Pa., plant. Bessemer sales for ingot molds have been improving and steel mill rollmakers in this district have bought iron. Malleable is $15, with bessemer quoted $15.50 and basic $14.50, Pittsburgh district furnace. An advance of 50 cents to $1 is in prospect this week. Midland Barge Co., Midland, Pa., will require a tonnage of steel castings for miscellaneous work to lock and dam No. 3, Tennessee river.

The Shenango Furnace Co. will relight its Sharpsville, Pa., merchant stack this week.

Cleveland—Sales and shipments continue to expand. Cleveland furnaces have shipped more pig iron so far in May than in all of April; another lake furnace's shipments are 75 per cent of the April total. New bookings are far ahead of those in the comparable period last month; in one instance, four times as large. Sales the past week by furnace interests with headquarters here were slightly over 10,000 tons. Inquiries likewise have improved, and more are developing for third quarter. Demand is more diversified. Operation of Cleveland foundries have not improved appreciably, but they are getting more inquiries for castings. A further advance of at least 50 cents is indicated for early announcement.

Chicago—An advance of 50 cents in foundry and malleable iron to $16 was announced effective May. 12

Shipments here are increasing, the movement this month for some interests being more than double that for the corresponding April period. New buying also has been active, induced by impending advances in prices. The automotive industry continues to lead in consumption, although steady gains have been noted in operations of smaller industries. Farm implement manufacturers show renewed interest.

Boston—Prices are firm, Buffalo grades for shipment to New England having advanced 50 cents while recent increases in southern and eastern Pennsylvania prices hold. Foreign prices also tend upward with India at $16 to $16.50, dock, and Dutch generally selling $1 higher. The Everett, Mass., furnace, adhering to silicon differentials, holds to $16 minimum, furnace, with small lots fairly active. About 440 tons arrived last week from India.

New York—While buying has increased, volume continues restricted and releases small. Leading orders include 800 tons of foundry iron for the Elmira, N. Y., plant of the General Electric Co. and 400 tons for the A. P. Smith Mfg. Co., East Orange, N. J., the latter being for fourth quarter, and reported going to a foreign producer. Buffalo iron for this district continues at $14, base, furnace, with the belief now prevailing in some quarters that there will be no change until eastern Pennsylvania iron undergoes further advance. Shipments on the New York state barge canal are expected to be resumed shortly, but not much iron is likely to come down for another 60 days.

Philadelphia—Following the recent advance in eastern Pennsylvania foundry iron, new orders have been light. Specifications on existing contracts are somewhat disappointing, although this situation is expected to change as the end of the quarter draws nearer and certain protections expire. While little buying of basic has been reported recently, it develops that close to 10,000 tons have been placed by eastern consumers within the past month. Imports of pig iron here in April totaled 15,339 tons, of which 8360 tons was India iron and 5677 tons Dutch.

Buffalo—Demand is broadening. General opinion is that Buffalo producers have sold in excess of 20,000 tons of iron during the past 30 days. Two furnaces are producing iron and a third is being made ready for a long run.

Birmingham, Ala.—Steady movement continues with sales in small lots and aggregating a little more than production. Plans call for blowing in another stack by June 1.

Cincinnati—Quotations remained unchanged during the past week, although increases in some districts have given a firming tendency. Several sales of 100-ton lots of northern iron were closed at about $14.50, base, Cleveland.

St. Louis—Buying is slightly slower, melters being fairly well covered. A further moderate increase in the melt appears likely. Inquiry for third quarter is better, but furnaces are not disposed to sell beyond June 30.

Toronto, Ont.—Small orders are more numerous, and for the week total around 500 tons. Melters continues to buy as demands require.

Iron Ore Stocks at Season's Opening Far Above Normal

Iron Ore Prices, Page 40

Cleveland—Lake Superior iron ore stocks at lower lake ports and blast furnaces May 1—the starting date for the ore season—were approximately 28,900,000 tons. This is 4,500,000 tons less than last year, indicating to producers considerable progress in the right direction; but still about 9,000,000 tons above normal. The large surplus again will tend to restrict shipments, despite increasing consumption.

Shipments from Lake Erie ports to interior furnaces in April—104,395 tons—compared with 35,083 tons in March, and 204,016 tons in April last year, according to the Lake Superior Iron Ore association.

Refractories Prices Up; Buying Is at Heavy Rate

Refractories Prices, Page 40

Pittsburgh—Effective May 15, prices on magnesite brick will be advanced $3.50 to $65, on chrome brick $2.50 to $45, and on dead burned grained magnesite $7 to $45. The advance is not shared by fireclay or silica brick although $35, Pennsylvania, for first quality fireclay or silica brick is the firmest in some time. Refractory specifications are running heavy and steel mills ars pressing for deliveries. Buyers were permitted to contract at $42.50 for chrome and $61.50 for magnesite up until May 15 but producers are requiring them to specify all of this tonnage before June 30. On all contracting and spot business after May 15, the new prices will apply. Openhearth schedules have called for much silica brick, but no blast furnace relining projects are current.

Scrap

Weirton Steel Buys 260,000 Tons—Price Advance Checks Speed—Movement Is Active

Pittsburgh—Weirton Steel Co., Weirton, W. Va., has bought from the Baltimore & Ohio railroad 15,000 freight cars and 400 locomotives for dismantling. The cars are expected to yield an average of 15 tons each and the locomotives 90 tons each of scrap. This will make a total of close to 260,000 tons. Payment is to be spread over three months. The railroad will dismantle the cars and ship underframes, wheels and axles to the steel plant. The price for this scrap, delivered, is $8.50 per ton for the locomotive steel and $9.50 for the car steel. This is slightly under previous quotations, size of the transaction probably being a cause. Weirton Steel Co. recently took 89,000 tons of railroad steel scrap from the Southern rail-

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated

HEAVY MELTING STEEL

Birmingham	7.00 to 8.00
Boston, dealers	5.00 to 5.50
Buffalo, No. 1	10.00 to 11.00
Buffalo, No. 2	8.00 to 9.00
Chicago	8.50 to 9.00
Cleve., No. 1	9.50 to 10.00
Cleve., No. 2	9.00 to 9.50
Det., No. 1 deal.	8.00 to 8.50
Det., No. 2 deal.	7.50 to 8.00
E. Pa . del. mill	9.00 to 9.50
E. Pa., No. 2 del.	7.00 to 7.50
Federal, Ill.	7.75 to 8.25
Granite City, Ill.	7.50 to 8.00
N. Y., deal, R. R.	6.00 to 6.25
N. Y. deal. No. 2	4.50
N. Y. deal. yd.	2.50 to 3.00
Pitts., No. 1	11.50 to 12.00
Pitts. No. 1 R. R.	12.00 to 12.50
St. L. No. 1 sel.	7.50 to 8.00
Valleys, No. 1	12.50 to 13.00

COMPRESSED SHEETS

Buffalo, dealers	8.00 to 9.00
Chi. (Factory)	6.50 to 7.00
Cleveland	9.50 to 10.00
Detroit, dealers	7.50 to 8.00
E. Pa. new mat.	7.00 to 7.50
Pittsburgh	11.00 to 11.50
Valleys	12.00 to 12.50

BUNDLED SHEETS

Buffalo	4.75 to 5.25
Cincinnati, del	4.75 to 5.25
Cleveland	6.50 to 7.00
Eastern Pa.	5.50 to 6.00
Pittsburgh	10.00 to 10.50
St. Louis	4.00 to 4.50

SHEET CLIPPINGS LOOSE

Chicago	3.50 to 4.00
Cincinnati	3.00 to 3.50
Detroit, dealers	3.00 to 3.50
St. Louis	4.00 to 4.50

STEEL RAILS SHORT

Birmingham	8.50 to 9.00
Boston, dealers	4.75 to 5.25
Buffalo	10.50 to 11.50
Chicago (3 ft.)	9.00 to 9.50
Chicago (2 ft.)	9.50 to 10.00
Cincinnati, del.	9.75 to 10.25
Detroit, deal.	10.50 to 11.00
Pitts. (open-hearth, 3 ft. and less)	12.00 to 12.50
St. Louis	10.00 to 10.50

STOVE PLATE

Birmingham	5.50 to 6.00
Boston, dealers	2.00 to 2.50
Buffalo	8.00 to 8.50
Chicago, net	7.00 to 7.50
Cinci., deal. net	4.00 to 4.50
Det., net deal.	3.50 to 4.00
Eastern Pa.	7.00 to 7.50
N. Y., deal. mill	3.50 to 4.00
St. Louis	6.00 to 6.50

COUPLERS, SPRINGS

Buffalo	10.00 to 11.00
Chicago	9.00 to 9.50
Eastern Pa.	10.00 to 10.50
Pittsburgh	13.00 to 13.50
St. Louis	8.00 to 8.50

ANGLE BARS—STEEL

Chicago	8.50 to 9.00
St. Louis	7.50 to 8.00

LOW PHOSPHORUS

Buffalo, billets and bloom crops	9.50 to 10.50
Cleveland bil. and bloom crops	12.00 to 13.00
Eastern Pa.	10.50 to 11.00
Pittsburgh billet bloom crops	13.75 to 14.25
Pitts., sheet bar crops	13.75 to 14.25

FROGS, SWITCHES

Chicago	8.50 to 9.00
St. Louis	7.50 to 8.00

SHOVELING STEEL

Chicago	8.50 to 9.00
Cleveland	5.75 to 6.00
St. Louis	7.50 to 8.00

RAILROAD WROUGHT

Birmingham	6.50 to 7.00
Boston, dealers	2.00 to 2.50
Buffalo, No. 1	6.00 to 6.50
Buffalo, No. 2	10.00 to 10.50
Chi., No. 1, net	7.00 to 7.50
Cinci., No. 2	7.00 to 7.50
Cinci., No. 2	6.50 to 7.00
Eastern Pa.	10.00 to 10.50
N. Y., No. 1, deal.	4.00 to 5.00
Pitts. No. 1	12.00 to 12.50
St. Louis, No. 1	5.25 to 5.75
St. Louis, No. 2	7.75 to 8.25

SPECIFICATION PIPE

Boston	3.00 to 4.00
Eastern Pa.	7.00 to 7.50
N. Y., deal.	3.25 to 3.75

BUSHELING

Buffalo, No. 1	8.00 to 8.50
Chicago, No. 1	6.50 to 7.00
Cinci., No. 1 deal.	4.50 to 5.00
Cinci., No. 2	2.75 to 3.00
Cleve., No. 2	6.50 to 7.00
Det., No. 1 new deal.	6.00 to 6.50
St. Louis, No. 1	4.50 to 5.00
Val. new No. 1	11.50 to 12.00

MACHINE TURNINGS

Birmingham	2.50 to 3.00
Boston, dealers	2.25 to 2.50
Buffalo	4.00 to 4.50
Chicago	4.00 to 4.50
Cinci., deal.	4.00 to 4.50
Cleveland	5.00 to 5.50
Detroit	4.50 to 5.00
Eastern Pa.	5.00 to 5.50
N. Y., deal.	2.00 to 2.50
Pittsburgh	8.25 to 8.75
St. Louis	2.50 to 3.00
Valleys	9.25 to 9.75

BORINGS AND TURNINGS
For Blast Furnace Use

Buffalo	4.00 to 4.50
Buffalo	4.00 to 4.25
Cinci., deal.	4.00 to 4.50
Cleveland	6.75 to 7.25
Detroit, deal.	6.00 to 6.50
Eastern Pa.	3.50 to 3.75
N. Y., deal.	2.00 to 2.50
Pittsburgh	7.25 to 7.75

CAST IRON BORINGS

Birming., chem.	8.50 to 9.50
Birming., plain	2.50 to 3.00
Boston, chem.	5.50 to 6.00
Boston, dealers	1.00 to 1.25
Buffalo	4.00 to 4.50
Chicago	4.50 to 5.00
Cinci., deal.	4.00 to 4.50
Cleveland	6.75 to 7.25
Detroit, deal.	6.00 to 6.50
Eastern Pa.	3.50 to 3.75
E. Pa., chem.	10.00 to 12.00
N. Y., deal.	2.50 to 3.00
Pittsburgh	7.25 to 7.75
St. Louis	3.00 to 3.50

PIPE AND FLUES

Cinci., deal.	3.50 to 4.00

RAILROAD GRATE BARS

Buffalo	4.50 to 5.00
Chicago, net	6.00 to 6.50
Cincinnati	4.50 to 5.00
Eastern Pa.	7.00 to 7.50
N. Y., deal.	4.00 to 4.50
St. Louis	5.00 to 5.50

FORGE FLASHINGS

Boston, dealers	3.50 to 3.75
Buffalo	6.00 to 7.00
Cleve. ov. 10 in.	8.25 to 8.50
Detroit	5.00 to 5.50

FORGE SCRAP

Boston, dealers	1.75 to 2.00
Chicago	9.50 to 10.00
Eastern Pa., del.	6.00 to 6.50

ARCH BARS, TRANSOMS

Chicago, net	7.00 to 7.50
St. Louis	6.00 to 6.50

AXLE TURNINGS

Boston, deal.	2.50 to 3.00
Buffalo	6.00 to 6.50
Chi., elec. fce.	6.50 to 7.00
Cleveland	5.50 to 6.00
Eastern Pa., del.	6.50 to 7.50
St. Louis	4.00 to 4.50

STEEL CAR AXLES

Birmingham	9.00 to 10.00
Boston, ship. pt.	7.50 to 8.00
Buffalo	10.00 to 11.00
Chicago, net	10.50 to 11.00
Eastern Pa.	14.50
St. Louis	8.75 to 9.25

SHAFTING

Boston, ship. pt.	7.50 to 8.00
Eastern Pa.	12.00 to 13.00
N. Y., deal.	7.50 to 8.00
St. Louis	7.50 to 8.00

CAR WHEELS

Birming., iron	7.00 to 7.50
Boston, iron deal.	4.25 to 4.50
Buffalo, iron	8.00 to 9.00
Buffalo, steel	10.00 to 11.00
Chicago, iron	9.50 to 10.00
Chi., rolled steel	9.50 to 10.00
Cincinnati iron	6.75 to 7.25
E. Pa. iron	9.50 to 10.00
E. Pa. steel	10.00 to 10.50
Pitts., iron	11.00 to 11.50
Pitts., steel	13.00 to 13.50
St. Louis, iron	6.00 to 6.50
St. Louis, steel	7.50 to 8.00

NO. 1 CAST SCRAP

Birmingham	8.00 to 8.50
Boston, No. 2	3.00 to 3.25
Boston, textile	6.00 to 6.25
Buffalo, cupola	9.25 to 9.75
Buffalo (mach.)	9.75 to 10.25
Chicago, agri., net	7.00 to 7.50
Chi., mach. net	8.50 to 9.00
Chi., railroad net	8.00 to 8.50
Cinci., mach. cup	7.25 to 7.75
Cleve. cupola	8.50 to 9.50
Det., net deal.	7.00 to 7.50
E. Pa. cupola	10.00 to 10.50
N. Y., cup. deal.	6.00 to 6.50
N. Y., del. local foundries	9.00 to 9.50
Pitts., cupola	10.50 to 11.00
San Fran., del.	13.50 to 14.00
Seattle	4.50 to 6.50
St. L. No. 1	6.00 to 6.50
St. L. No. 1 mach.	6.50 to 7.00

HEAVY CAST

Boston, del.	4.25 to 4.50
Bost., mach. cast	7.00 to 7.50
Buffalo, break.	7.00 to 7.50
Cleve., break	6.50 to 7.00
Detroit, auto net deal.	9.00 to 9.50
Det. break., deal.	6.00 to 6.50
Eastern Pa.	9.50 to 10.00
N. Y. No. 1, deal.	5.50 to 6.00
N. Y. break, deal.	5.50 to 5.75
Pittsburgh	9.00 to 9.50

MALLEABLE

Boston, consum.	9.00 to 9.50
Buffalo	9.50 to 10.50
Chicago, agri.	6.50 to 7.00
Chicago, R. R.	9.00 to 9.50
Cinci., agri. del.	7.00 to 7.50
Cinci., R. R. del.	7.50 to 8.00
Cleveland, rail	10.00 to 10.50
Det. auto deal.	6.00 to 6.50
St. Louis	7.00 to 7.50

RAILS FOR ROLLING
5 feet and over

Birmingham	7.50 to 8.00
Boston, deal.	5.00 to 5.50
Buffalo	7.50 to 8.00
Chicago	10.00 to 10.50
Eastern Pa.	9.50
New York dealer	5.50 to 6.00
St. Louis	8.75 to 9.25

LOCOMOTIVE TIRES

Chicago, cut	8.50 to 9.00
St. L., No. 1	6.00 to 6.50

LOW PHOS. PUNCHINGS

Buffalo	10.00 to 10.50
Chicago	10.00 to 10.50
Eastern Pa.	9.00
Pittsburgh	13.00 to 13.50

road which sold some 200,000 tons.

The scrap market here is soft because of the mounting long position of most brokers. Heavy melting steel now is quoted at $11.50 to $12.

Cleveland—Buying has lessened after the bulge of recent days but shipments are being made freely to melters. In the valleys the market is active and prices are up 50 cents on heavy melting steel. Consumers there are urging prompt shipment to meet their needs.

Chicago—Scrap is marking time following its recent sharp upturn. Supplies are only moderate despite the higher quotations although railroads are expected to dispose of larger tonnages than formerly. Shipments to mills against contracts reflect the improvement in buying and in open-hearth operations. Prices generally are steady and unchanged.

Boston—Scrap prices are stronger on active grades, notably heavy melting and No. 2 steel, supply of the former in New England being greatly reduced. These grades delivered at Worcester are $6.50 to $7 and $5.50, respectively. Higher prices in the Pittsburgh district have brought better prices offered for shipment to that area, but little business has been done, dealers having bid $5.65 to $6.25, f.o.b. Buying against several thousand tons of No. 1 and No. 2 for export to Japan continues with shippers paying $6.25, dock, and $5 for the latter grade. A utility has sold 2000 tons of rails. For water shipment to eastern Pennsylvania 1000 tons of No. 1 scrap moved last week.

New York—Scrap prices continue strong and higher prices in the Pittsburgh district has made New York competitive with a fair tonnage moving by rail. This situation has resulted in firm prices and some recent advances on both No. 1 and No. 2 steel for export. Most movement to Western Pennsylvania has been No. 2 steel. One dealer has considerable material to cover against export orders. Domestic buying of scrap has increased, although little for the Buffalo district has been noted here.

Buffalo—Sale of 1000 tons of No. 1 heavy melting steel to Bethlehem for Lackawanna, N. Y., delivery is reported to have been made at $10. Dealers who are offered similar contracts are said to have held out for 50 cents to $1 more. This is a net increase of $3 from the last sale to Bethlehem here. Other prices are proportionately strong and dealers have revised the entire list on the theory that an actual basis of prices has been established.

Detroit—Iron and steel scrap shows more of a tendency to level off than to advance, as for a number of weeks, but the market has lost none of its buoyancy and appears to be more in a breathing spell. All interests have been watching the market closely, after so many weeks of improvement. Offerings by automobile manufacturers are expanding, but are readily absorbed by demand both within and from without the district. Price changes include 50 cent advances on borings and machine shop turnings and 25 cents on short shoveling turnings.

Philadelphia—Scrap prices continue to advance, increases ranging from 50 cents to $2 a ton. The heavy melting steel grades are up $1, No. 1 now holding at $9 to $9.50, delivered, and No. 2 at $7 to $7.50. Of the major grades, melting steel is perhaps most scarce, although heavy breakable and cupola cast are also increasingly difficult to obtain, at 50 cents to $1 higher.

Cincinnati—Iron and steel scrap continue strong, with dealers' quotations advanced 25 to 50 cents on

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most items. Little additional material has been attracted by advances so far, and scrap is scarce.

St. Louis—The upturn in iron and steel scrap prices continues, some grades advancing as much as $2 per ton. Latest revisions affect principally heavy melting steel and steel specialties, but other grades also advanced. The principal transaction was the purchase of 5000 tons of steel by an east-side mill for delivery through the next two or three months.

Birmingham, Ala. — Further strength in the iron and steel scrap market is noted but prices are not advanced, No. 1 cast being held at $8 and heavy melting steel at $7. Inquiries are more numerous for several grades.

Toronto, Ont.—Minor improvement in some branches of the steel trade has been reflected in better demand for scrap. The market is specialized, with only a few grades active. No. 1 machinery cast is moving freely, but supplies are limited, dealers offering $9 to $9.50 per net ton. Heavy melting steel and turnings are at a standstill, but dealers continue to quote buying prices at $7 and $2, respectively, in gross tons.

Equipment

Three 4-High Mills Ordered; Repair Parts Sales Up

Pittsburgh—United Engineering & Foundry Co. here received orders for a single stand 4-high mill each from American Sheet & Tin Plate Co., Jones & Laughlin Steel Corp., and Republic Steel Corp. The Jones & Laughlin mill will be installed at Aliquippa Pa., the Republic mill in the Youngstown, O., district and the American Sheet & Tin Plate Co. equipment at Gary, Ind. Design of these mills is expected to make possible a new high rate of production because of the speed with which the heavy strip may be rolled down to finished gages while cold.

Considerable activity is noted at present on bar mill stands for finishing hot-rolled bars to close tolerances, a procedure which has been described in this column in previous issues of STEEL. Several inquiries are out which appear ready for closing.

Considerable activity likewise is shown in inquiries and orders for sheet levelers. One mill in this district had a new sheet leveler installed last week and has been straightening and reclaiming as high as 80 per cent of its discards. Sutton Engineering Co., Pittsburgh, is preparing to announce a new type of sheet leveler which embodies wabbling roll levelers, that are said to impart combined advantages of stretcher leveling and roller leveling.

Chicago — Equipment markets show a better tone, recent improvement in general industrial activity gradually being reflected in inquiries and orders for tools and machinery. Betterment in sales so far has been slight, but inquiries have improved steadily over recent weeks. Demand for miscellaneous small tools has shown a more substantial gain.

Steel plants are making only moderate purchases of new equipment, one exception being the American Sheet & Tin Plate Co. which has ordered a 4-high mill for tin plate production at Gary, Ind., as noted above.

New York—Inquiry for machinery and equipment is light, although in some industries operating schedules have been stepped up encouragingly. An upstate refrigerator builder has materially increased production and a northern New Jersey ball bearing plant is operating at the best rate in more than two years. This plant has purchased some equipment.

Worcester, Mass. — While only slight improvement has been made in demand for machinery and plant equipment, encouraging gains have been registered by several New England industries now operating at higher rates. This is especially true of Connecticut ball bearing plants, automotive releases stimulating production.

One Worcester machine builder has booked additional equipment for the Pacific coast, including five grinding machines for a tractor plant.

Cleveland—In line with general improvement of the past two weeks inquiries and orders for machinery and equipment have gained, in some instances sensational spurts being recorded. A press builder reports a 300 per cent increase in repair orders. Inquiries totaling nearly $3,000,000 for work in new mills and repairs also are reported by this interest. The turret lathe builder here notes a gratifying increase in repair parts orders, indicating that many plants are once more putting equipment in order and getting set for work. An order for 12 lathes has been closed by this builder. National Steel Corp. in Detroit is said to be undertaking a $250,000 construction program, involving the erection of a new slag plant, relining two blast furnaces and other maintenance work.

UNITED NICKEL CHILL ROLLS

For flat work, both hot and cold, United nickel chills are being applied regularly to all duties demanding a chilled iron roll. The alloy has definite advantages in a higher degree of hardness, increased toughness, and a greater resistance to firecracking. This roll is made in three grades:

GRADE A — HARD

For cold rolling of sheets and strips, both ferrous and non-ferrous, when fine finish and resistance to marking are required.

GRADE B — MEDIUM

For hot rolling. It is recommended for finishing stands of hot strip or sheet mills.

GRADE C — MILD

For heavy duty hot rolling. It is recommended for the intermediate stands of hot strip and sheet mills, and for plate mills.

UNITED

ENGINEERING & FOUNDRY COMPANY

PITTSBURGH—PENNSYLVANIA

Warehouse

Selling Volume Greater and Quotations Are Adjusted

Pittsburgh—Warehouse sales are fully equal to those of April. Buying is well diversified and prices show strength. New warehouse schedules on galvanized and blue annealed sheets are now in effect. On blue annealed over 48 inches, 2.90c, Pittsburgh warehouse, is still quoted although on narrower sizes one jobber here is quoting 2.60c for in-town delivery on less than 25 bundles.

Cleveland—Although the increase in warehouse tonnage so far is not comparable with that for mills, orders are more plentiful and some from consumers who have not been heard from in months. A better feeling exists and warehouse interests believe they will feel the surge in miscellaneous requirements in June. Demand for warehouse service has increased appreciably. Jobbers say the price of galvanized sheets is too low in relation to mill prices, and some adjustment is contemplated.

Chicago—Business continues to gain steadily in number and size of orders. Buying is better diversified and sales recently were in the best volume so far this year. Prices of plates 2 inches thick and heavier have been reduced from 3.75c to 3.00c, with extras for flame cutting now charged on a per foot basis on plates over 1 inch thick instead of on a per pound basis.

New York—Warehouse volume continues to make encouraging gains, May thus far being well ahead of April with buying well distributed. Number of orders and tonnage are heavier. While no price changes have developed, prices are steadier with less shading.

Philadelphia—Jobbers report little variation in demand from a week ago and while domestic prices generally are unchanged there has been sharp competition by foreign steel. In view of recent developments in foreign exchange and the upward tendency of the iron and steel markets generally, this has come as a surprise.

Boston—A reduction of 15 cents on No. 10 gage annealed sheets has been put into effect, bringing the price to 2.75c. Volume of warehouse sales is increasing.

Detroit—Warehouse business continues to show slight improvement from week to week, with prices unchanged. Sentiment is improving, May automobile production is expected to cross 200,000 units, and there are occasional rush purchases from warehouse.

Cincinnati—Buying of warehouse materials here is improved, with prospects the tonnage for May will be 10 or 15 per cent over April. Some structural materials are moving.

St. Louis—Warehouse sales are expanding gradually. Materials for levee and river improvement work are active and there has been some improvement in the demand for highways. Railroad buying is better.

Warehouse Quotations at Leading Centers, in Cents Per Pound

(All Philadelphia prices subject to quantity differentials except reinforcing and Swedish bars)

STEEL BARS □

Baltimore*	2.35c
Boston††	2.90c
Buffalo	2.95c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Cleveland	2.75c
Detroit	2.85c
Houston	2.40c
Los Ang.	3.30c
New Orleans	2.50c
New York‡(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.50c-2.60c
Portland	3.00c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.00c
St. Paul	3.00c
Tulsa	3.25c

IRON BARS □

Baltimore	2.35c
Boston††	3.10c
Buffalo	3.15c
Chattanooga	3.00c
Chicago	2.75c
Cincinnati	3.00c
Detroit	2.85c
New York‡(d)	3.10c
Philadelphia	2.45c
St. Louis	3.00c
Tulsa	3.25c

REINFORC. BARS □

Baltimore	2.35c-3.00c
Boston	3.10c-3.25c
Buffalo	2.95c
Chattanooga	3.00c
Cincinnati	3.00c
Cleveland	2.10c-2.25c
Detroit	2.85c
Houston	3.00c
Los Ang. cl.	2.10c
New Orleans	2.75c
Los Ang., lcl	2.40c
New York	2.65c-3.10c
Phila.	2.62½c
Pittsburgh	2.50c-2.60c
San Fran. cl.	2.00c
San Fran. lcl	2.40c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.25c
Young.	2.30c-2.60c

SHAPES □

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	2.65c
Los Ang.	3.30c
New Orleans	3.50c
New York(d)	3.10c
Philadelphia	2.45c
Pittsburgh	2.85c
Portland	3.35c
San Fran.	3.15c
Seattle	3.60c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

PLATES □

Baltimore*	2.35c
Boston††	3.00c
Buffalo	3.20c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Cleve., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.30c
New Orleans	3.50c
New York(d)	3.30c
Philadelphia	2.45c
Phila. floor	5.10c
Pittsburgh	2.35c
Portland	3.35c
San Fran.	3.15c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.25c
Tulsa	3.50c

NO. 10 BLUE □

Baltimore*	2.80c
Boston††	2.75c
Buffalo	3.10c-3.25c
Chattanooga	3.44c
Chicago	2.75c
Cincinnati	3.05c
Cleveland	2.75c
Det., 8-10 ga.	2.90c
Houston	3.35c
Los Ang.	3.80c
New Orleans	3.25c
New York	2.75c
Portland	4.00c
Phila.*† (e)	2.50c
Pitts.**	2.60c
San Fran.	3.75c
Seattle	3.50c
St. Louis	3.00c-3.15c
St. Paul	3.45c
Tulsa	3.70c

NO. 24 BLACK □

Balt.*†	3.50c
Boston††	3.85c
Buffalo	3.70c
Chattanooga	3.50c
Chicago	3.20c
Cincinnati	3.50c
Cleveland	3.25c
Detroit	3.30c
Los Ang.	4.20c
New York	3.25c
Phila.*† (e)	3.15c
Pitts.**	3.35c
Portland	4.50c
San Fran.	3.70c
Seattle	4.25c
St. Louis	3.45c
St. Paul	3.695c
Tulsa	4.75c

NO. 24 GAL. SHEETS □

Balt.*†	4.00c
Buffalo	4.00c
Boston††	4.00c
Chattanooga	3.95c
Chicago	3.25c-3.50c

††Base 15,000 lbs., extras on less.

Cincinnati	3.55c
Cleveland	3.50c
Detroit	3.50c
Houston	3.57c
Los Ang.	4.50c
New Orleans	3.95c
New York	3.50c
Phila.*† (e)	3.60c
Pitts.**	3.60c-3.85c
Portland	5.00c
San Fran.	4.30c
Seattle	4.75c
St. Louis	3.75c
St. Paul	4.19c
Tulsa	5.10c

†BANDS □

Baltimore	2.65c
Boston††	3.40c
Buffalo	3.30c
Chattanooga	3.20c
Chicago	2.95c
Cincinnati	3.20c
Cleveland	3.00c
Det. 3/16-in. & lighter	3.15c
Houston	2.55c
Los Ang.	3.80c
New Orleans	2.75c
New York(d)	3.30c
Philadelphia	2.75c
Pittsburgh	2.95c
Portland	3.85c
San Fran.	3.15c
Seattle	3.50c
St. Paul	3.20c
Tulsa	3.45c

†HOOPS □

Baltimore	2.65c
Boston	4.90c
Buffalo	3.95c
Chicago	3.50c
Cincinnati	3.75c
Det. No. 14 & lighter	3.65c
New York	3.30c
Philadelphia	3.00c
Pittsburgh	3.60c
Seattle	5.00c
St. Paul	3.75c

†New extras apply.

COLD FIN. STEEL □

Baltimore (c)	3.48c
Boston	3.60c
Buffalo	3.00c
Chattanooga*	3.65c
Chicago	3.00c
Cincinnati	3.32c
Cleveland	2.95c
Detroit	3.15c
Los Ang.	5.50c
New Orleans	4.25c
Philadelphia	3.35c
Pittsburgh	2.95c
Portland (f)	4.50c
San Fran.(d)	5.50c
Seattle (f)	4.50c
St. Paul	3.20c
St. Louis	3.36c
Tulsa	4.65c

COLD ROLL. STRIP □

Boston 0.100 in., 500 lb. lots	5.20c
Buffalo	5.25c
Chicago (b)	5.65c
Cincinnati	5.80c
Cleve. (b)	5.55c
Detroit	5.40c
Phila. (c)	4.55c
New York	4.55c

(a) Rounds, hex. only.
(b) Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d) Minus quant. diff.
(e) New mill classif.
(f) Rounds only.
(g) Bessemer analysis extras included.

‡Domestic bars.
*Plus quan. extras.
**Under 25 bundles.
*†50 or more bundles.

Nonferrous Mill Products

Base price cents per pound f.o.b. mill except otherwise specified. Copper and brass product prices based on 6.75c, Conn., for copper

Sheets	
Yellow brass (high)	12.25
Copper, hot rolled	14.37½
Lead sheets, cut, to jobbers	7.25
Zinc sheets (100-lb. base)	9.00
Tubes and Pipes	
Seamless yellow brass (high)	14.00
Seamless copper	13.12½
Rods	
Yellow brass (high, full turning)	9.75
Naval brass	10.87½
Anodes	
Copper untrimmed	11.75
Wire	
Yellow brass (high)	12.25

Old Metals

Dealers' buying prices, cents lb

No. 1 Composition Red Brass	
New York	3.25 to 3.50
Chicago	3.12½ to 3.62½
Cleveland	3.75 to 4.25
St. Louis	3.25 to 3.50
Heavy Yellow Brass	
New York	2.50 to 2.62½
Heavy Copper and Wire	
New York	4.50 to 4.75
Chicago, No. 1	4.37½ to 4.62½
Cleveland	4.00 to 4.50
St. Louis	3.75 to 4.00
Composition Brass Borings	
New York	2.75 to 3.00
Yellow Brass Tubing	
Cleveland	3.00 to 3.50
Light Copper	
New York	3.50 to 3.75
Chicago	3.12½ to 3.62½
Cleveland	3.75 to 4.25
St. Louis	3.25 to 3.50
Light Brass	
Chicago	1.75 to 2.00
Cleveland	2.00 to 2.50
St. Louis	2.25 to 2.50
Lead	
New York	2.37½ to 2.50
Cleveland	2.25 to 2.50
Chicago	2.12½ to 2.37½
St. Louis	2.50 to 2.75
Zinc	
New York	1.50 to 1.62½
Cleveland	1.37½ to 1.50
Chicago	1.75 to 1.87½
St. Louis	1.50 to 1.75
Aluminum	
Clippings, new, soft, Cleve.	10.00 to 11.00
Clippings, hard, Cleveland	7.00 to 8.00
Borings, Cleveland	3.00 to 4.00
Mixed cast, Cleveland	5.25 to 5.75
Mixed cast, St. Louis	5.00 to 5.25

Secondary Metals

Brass ingot, 85-5-5-5	6.50
Remelt aluminum No. 12	9.50 to 10.00

Metals

Copper, Lead and Tin Advance To Still Higher Levels—Zinc Is Slow—Nickel Sales Gain

New York—The principal development in the metals last week was the further rise in copper to 7.00c, Connecticut, a jump in tin to more than twice the 1932 low point and a further $3 a ton advance in pig lead. Zinc was barely steady. Silver moved downward. Aluminum, nickel and antimony showed little change.

Copper—Further strength appeared in the market late in the week with both custom smelters and mine producers quoting electrolytic metal at 7.00c, Connecticut, representing an advance of 2 cents in a period of about a month. Buying was in fair volume, especially by fabricators which have been receiving a good volume of business recently. Prospects for sharp curtailment of production this summer and the administration's policy for equitable price levels were supporting factors. Current production is about 30,000 tons monthly compared with prospective reduction in output to around 13,000 to 15,000 tons this summer. Copper and brass products were advanced ¼-cent further with sheet brass now 12.25c and rod 9.75½c. Copper wire went up ½-cent. Scrap was firm.

Lead—Sellers advanced their quotations to the bases of 3.65c, New York, and 3.52½c, East St. Louis, last Monday following heavy demand. Sales last week were mostly for carlots for delivery in June. Many requirements already have been well covered.

Zinc—Most sellers asked 3.75c, East St. Louis, for prime western metal during the week but tonnage could be had at times under this level. Unfilled business on sellers' books more than doubled in April so that a quiet period apparently is in prospect for at least the time being. Stocks continued to increase in April but betterment in the statistical position is looked for.

Tin—Straits tin jumped to approximately 37.00c a pound by the close of last week. This reflected strength in the sterling exchange rate, higher prices abroad and the further cut in output which will go into effect July 1, in addition to heavier consumption. A tight position in spot resulted in a premium for this position.

Antimony—Small-lot buying was noted with prices unchanged.

Nickel—Sales have been increasing recently. International Nickel will resume at its Orford process plant at Copper Cliff within two weeks.

Distillates Active, Firm

New York—Demand for toluol has stepped up, with lacquer makers ordering heavier. Benzol and xylol also are slightly more active. Distillate prices are firm. Sulphate of ammonia is seasonally active. While coke oven operations have been increased in spots, stocks are not large.

Coke By-Products

Per Gallon Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.22
90 per cent benzol	0.22
Toluol	0.30
Solvent naphtha	0.26
Commercial xylol	0.26

Per Pound at Producers' Plants in 250-Pound Drums

Phenol	0.153 to 0.173

Per Pound at Producers' Plants

Naphthalene flakes	4.75 to 5.75
Naphthalene balls	4.75 to 5.75

Per 100 Pounds Atlantic Seaboard

Sulphate of ammonia	$1.15

Quicksilver Steady

New York—Quicksilver prices continue unchanged with small lots $57 a virgin flask of 76 pounds, and round lots $56 to $56.50 a flask.

Nonferrous Metal Prices of the Week, Cents a Pound

Spot unless otherwise specified

	Copper, Electro. del. Conn.	Copper, Lake, del. Midwest	Copper, Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 98-99%	Antimony Spot, N. Y.	Ingot Nickel
May 6	6.75	6.87½	6.50	36.00	36.37½	3.50	3.37½	3.70	*22.90	6.25	35.00
May 8	6.75	6.87½	6.50	36.00	36.12½	3.65	3.52½	3.75	*22.90	6.25	35.00
May 9	6.75	6.87½	6.50	36.00	36.12½	3.65	3.52½	3.75	*22.90	6.25	35.00
May 10	6.75	6.87½	6.50	36.00	36.00	3.65	3.52½	3.70	*22.90	6.25	35.00
May 11	6.75	6.87½	6.50	36.87½	37.00	3.65	3.52½	3.75	*22.90	6.25	35.00
May 12	7.00	7.12½	6.75	36.75	36.87½	3.65	3.52½	3.75	*22.90	6.25	35.00

*Nominal quotation. Market range 18.90c to 22.90c.

Pacific Coast

Further Bridge Tonnage Aids Activity in West — Seattle Places 4200 Tons Plates for Water Line—Prices Are Firm—Pipe Buying Awaits Better Means of Financing

San Francisco—(*By Air Mail*)—Although eastern steel operations have improved decidedly it is too early for a reflection in this market. However, prices have been advanced $2 a ton on hot-rolled annealed sheets, and $3 on cold-rolled.

Little new reinforcing bar business has developed. Columbia Steel Co. took 2572 tons and 2450 tons additional for the East and West bay superstructures of the San Francisco-Oakland bridge. This brings the total for these superstructures to 7180 tons. More than 6500 tons still are pending for the bridge. Bids have just been opened on 743 tons for a jail at San Francisco. Concrete Engineering Co. is low bidder on 260 tons for outlet tunnels for San Gabriel Dam No. 1, Los Angeles.

Western Pipe & Steel Co. has booked 200 tons of plates for three tanks for the metropolitan water district, Los Angeles. Bids wil be called soon for 5860 tons for the Pine Canyon dam pipe line, Pasadena, Calif., and on 4125 tons for the Bouquet canyon penstock for Los Angeles.

Columbia Steel Co. booked 4225 tons and 1695 tons additional of shapes for the East and West bay superstructures of the San Francisco-Oakland bridge. This brings the total tonnage for each, respectively, to 58,350 tons and 64,000 tons. Shapes still pending on contracts No. 2, 3, 4 and 5 of the same project aggregate 18,470 tons. Bids will be called soon on 279 tons for three bridges on Ramona boulevard, Los Angeles. Prices are firm at 2.10c, c.i.f., for standard shapes and 2.20c for wide flange material.

The cast iron pipe market is quiet. No award has yet been made on 515 tons of standard pipe for Hoover dam. Approximately 1000 tons of pipe will be needed for the Yerba Buena island crossing of the San Francisco-Oakland bridge.

4200 Tons Plates Placed

Seattle—The largest award for plates in the Pacific Northwest this year, 4200 tons for reconstruction of a main supply line for the city water system, was placed this week with the Puget Sound Machinery Depot, Seattle, low bidder, at $373,323. Steel will be furnished by the Lukens Steel Co., Coatesville, Pa., represented locally by A. M. Castle & Co. Mortar covered steel was adopted by the board of public works, 5/16-inch plates being used wrapped 1/5-inch in a cement coating with embedded wire mesh. Cement-Wrapped Pipe Co. Ltd., which will establish a local plant, has the subcontract. The job involves a 78-inch main, 25,800 feet in length, replacing wood pipe, to be completed by Dec. 31. It involves also 20 tons of reinforcing and a car of wire mesh.

The steel trade is expecting increased mill prices. Galvanized sheets are up $2 a ton to 3.35c, and the new quotation on nails is $2.50. Bars, shapes and plates are unchanged but a revision is expected.

Jobbers report improved turnover, with increases over last month. The whole line is moving more actively, plates and tanks probably showing the best turnover. Brewery projects have been of some importance.

Steel in Europe

Britain and Continent Find Conditions Grow Better

London — (*By Radio*)—Business is quiet, but its tone is confident. Middlesbrough pig iron is strengthening its position, however, hematite stocks continue large with prices unremunerative. Manufacturers of semifinished steel are busy since Continental competition has ceased. Structural steel demand has improved somewhat. Birmingham makers are dull, but hopeful. Galvanized sheet exports are dropping. Tin plate is firmer.

John Lysaght Ltd. has arranged with Hadfields Ltd. to roll the latter's stainless steels.

The Continent reports prices hardening, especially in Belgium and Luxemburg, and some works are well booked. The outlook still is somewhat uncertain.

Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 11

Export Prices f.o.b. Ship at Port of Dispatch—By Cable (or Radio)

	British gross tons U. K. ports		Continental Channel or North Sea ports, metric tons Gold parity, $4.8665	
PIG IRON	£ s d		£ s d	£ s d
Foundry, 2.50-3.00 Silicon	$11.61	2 18 6	$ 8.27	1 14 0
Basic bessemer	10.72	2 14 0*	6.81	1 8 0
Hematite, Phos. .03-.05	11.71	2 19 0	.....	.....
SEMIFINISHED STEEL				
Billets	$19.85	5 0 0	$10.71 to $10.95	2 4 0 to 2 5 0
Wire rods, No. 5 gage	29.78	7 10 0	$21.90	4 10 0
FINISHED STEEL				
Standard rails	$30.77	7 15 0	$26.77	5 10 0
Merchant bars	1.15c	6 10 0	.61c	2 15 0
Structural shapes	1.31c	7 7 6	.54c to .55c	2 9 0 to 2 10 0
Plates, †¼ in. or 5 mm	1.46c	8 5 0	.83c	3 15 0
Sheets, black, 24 gage or 0.5 mm.	1.50c	8 10 0	1.29c	5 17 6
Sheets, gal., 24 gage, corr.	1.86c	10 10 0	1.46c	6 12 6
Bands and strips	1.37c	7 15 0	.83c	3 15 0
Plain wire, base	1.55c	8 15 0	1.18c	5 7 6
Galvanized wire, base	1.86c	10 10 0	1.38c to 1.40c	6 5 6 to 6 7 6
Wire nails, base	2.12c	12 0 0	1.27c	5 15 0
Tin plate, box 108 lbs.	$ 3.18	0 16 0	.....	.....

British ferromanganese $68 delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f.o.b.

Domestic Prices at Works or Furnace—Last Reported

	£ s d		French Francs		Belgian Francs		Reich Marks	
Fdy. pig iron, Si. 2.5	$12.41	3 2 6*	$ 9.26	200	$ 9.51	290	$18.98	69
Basic bessemer pig iron	11.71	2 19 0*	7.87	170	7.22	220	20.76	75.50
Furnace coke	2.63	0 13 3	5.56	120	3.61	110	5.29	19.25
Billets	19.85	5 0 0	17.83	385	12.96	395	26.54	96.50
Standard rails	1.46c	8 5 0	1.46c	697	1.73c	1,150	1.65c	132
Merchant bars	1.19c	6 15 0	1.11c	530	.75c	500	1.38c	110
Structural shapes	1.55c	8 15 0	1.16c	550	.74c	490	1.34c	107.50
Plates, †¼-in. or 5 mm	1.55c	8 15 0	1.43c	680	.95c	635	1.59c	127
Sheets, black	1.68c	9 10 0§	1.79c	850‡	1.05c	700‡	1.80c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	2.08c	11 15 0	2.94c	1,400	2.10c	1,400	4.63c	370
Plain wire	1.55c	8 15 0	2.37c	1,130	1.95c	1,300	2.21c	177
Bands and strips	1.68c	9 10 0	1.05c	500	1.01c	675	1.59c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continental usually for basic-bessemer steel. (a) dd. Middlebrough.

Here and There in Industry

UNION CARBIDE & CARBON CORP., New York, is progressing rapidly in its exhibit at Century of Progress exposition in Chicago. Its exhibit is on the ground floir of the hall of science and will contain operating models and dramatized diagrams to explain uses of its products, in some cases automatically activated to give repeated cycle of motion and animation. The various products of the company and its various subsidiaries will be shown. This company has also furnished specimens of almost half the 92 known elements for the exposition's periodic table of elements, being the only practical source of a large percentage of these elements.

□ □ □

Republic Steel Corp., Youngstown, O., has moved the offices of its northern ore mines to 808 Sellwood building, Duluth.

□ □ □

Whiting Corp., Harvey, Ill., has moved its Chicago office to 140 South Dearborn street, from 20 North Wacker drive.

□ □ □

Moltrup Steel Products Co., Beaver Falls, Pa., has changed its New York office location to 702 Chrysler building, from 3314 Chrysler building.

□ □ □

Earle Gear & Machine Co., Philadelphia, has moved its New York sales office from 95 Liberty street to the Singer building, 149 Broadway.

□ □ □

George J. Hagan Co., Pittsburgh, industrial furnace builder, has moved from the Chamber of Commerce building to 2400 Carson street east.

□ □ □

Franklin Steel Works, Franklin, Pa., has moved its New York district offices from 52 Vanderbilt avenue, New York, to 210 Van Brunt street, Brooklyn, N. Y.

□ □ □

Morrison Metalweld Process Inc., Buffalo, has moved its Chicago office from the Chicago plant to the Great Northern building, 20 West Jackson boulevard.

□ □ □

Peerless Iron Works Co., Lafayette, Ind., is working on an emergency production schedule, with day and night shifts of 11 hours each, for the first time in more than three years.

□ □ □

Byron-Jackson Co., Berkeley, Calif., pump division, has moved its Mid-Continent office from Tulsa, Okla., to Fort Worth, Tex. Lynn Sawyer is in charge.

□ □ □

Morgan Engineering Co., Alliance, O., manufacturer of steel mill equipment and overhead traveling cranes, has moved its New York office to 11 West Forty-second street. Evan J. Parker is in charge.

□ □ □

Torchweld Equipment Co., Chicago, has moved its offices and plant to 1035 West Lake street, where double former space is available. Additional equipment is being installed to meet enlarged demand.

□ □ □

Perfection Cooler Co., Michigan City, Ind., has been absorbed by Geuder, Paeschke & Frey Co., Milwaukee, and will be operated as the Perfection Cooler and Dispenser division.

□ □ □

Rudy Furnace Co., Dowagiac, Mich., finds unit shipments in April were 69 per cent better than in March and double those of April, 1932. Increased demand has caused an increase of 25 per cent in foundry production.

□ □ □

Detroit Moulding Corp., Detroit, has bought the Jay Hayes Industries, Lansing, Mich., and the Grand Rapids Metal Craft Corp., Grand Rapids, Mich. Equipment of these concerns will be moved to Detroit and manufacturing concentrated there.

□ □ □

National Enameling & Stamping Co., Milwaukee, will produce steel kegs at its plant at Granite City, Ill., and also probably at its plant at New York, according to Alfred Kieckhefer, president. Some new equipment will be needed for this line of production.

□ □ □

William M. Bailey Co., engineer, Pittsburgh, has received an order through its sales representative, Ashmore, Benson, Pease & Co. Ltd., in England, for eight thermal expansion valves. This is the first order from abroad for these valves, marking the start of selling for export.

□ □ □

J. P. Devine Mfg. Co. Inc., Mt. Vernon, Ill., has moved its Chicago office from 105 West Madison street to 307 North Michigan boulevard, room 1114. F. R. Murphy is representative. Its New York office has been moved from West Forty-third street to 205 East Forty-second street, room 603. R. E. Lemire is in charge.

□ □ □

Flour City Ornamental Iron Co., Minneapolis, since 1929 operated its plant in Minneapolis as a subsidiary to the General Bronze Corp., New York. Since March 27 the Flour City Ornamental Iron Co. has reacquired its plant and property and is operating independently under its old name and management.

□ □ □

Black & Decker Mfg. Co., Towson, Md., manufacturer of electrical tools, announces it has balanced its budget after three years in the red and now is operating on a comfortable margin of profit. Gains in orders and a better scale of collections have contributed to this. Employes and hours of employment have been increased recently.

□ □ □

Hyatt Roller Bearing Co., Newark, N. J., will have an elaborate exhibit in the General Motors building at the Century of Progress fair at Chicago. It will include cutaways of industrial units with its bearings, agricultural machinery, railway journal boxes and automotive applications. A 6-foot model of the plant at Harrison, N. J., will be shown, lighted and part animated. Murals showing mobile and industrial applications of bearings will form a background.

□ □ □

Tinius Olsen Testing Machine Co., Philadelphia, will have a varied exhibit of testing machines at the Century of Progress exposition in Chicago this summer. Included will be a 60,000-pound capacity universal testing machine, with all attachments; a smaller machine of 2000 pounds capacity; hardness testing equipment; ductility testing machine; the largest type Olsen-Lundgren dynamic balancing machine; a special Olsen dynamic balancing machine never before exhibited; various strain gages, extensometers and proving rings.

Air Conditioning, 100,000-Ton Market, a Recovery Aid

(*Concluded from Page* 14)

with five tons of conditioned air per minute. It also will be equipped with three air conditioning and three centrifugal refrigerating machines, with a capacity of 325 tons of melting ice a day.

An ingenious method of distributing the air evenly throughout the audience has been worked out by the engineers. The inlets are to be in the dome and ceilings, and the volume of each so controlled that an "ethereal climatic blanket" will be falling uniformly over the audience. After performing its service it is withdrawn through floor outlets.

The air conditioning systems are of the type developed by Willis H. Carrier, widely known air conditioning engineer, who designed the systems in the capitol at Washington and the White House executive offices.

Construction and Enterprise

New England

PAWTUCKET, R. I.—R. Bliss Mfg. Co. has been incorporated with $50,000 capital to manufacture vises, screws and other products, by Maurice E. Messier and George Paquin, Pawtucket, R. I.

New York

NEW YORK—Endlein Engineering Corp. has been incorporated with 100 shares no par value to manufacture machinery, by Carl Endlein, 462 East Twenty-second street, Brooklyn, N. Y.

NEW YORK—Columbia Steel Rule Die Corp. has been incorporated with $10,000 capital to cut and mount dies, by Ray Ellars, 270 Lafayette street, New York. Filed by Abraham L. Feinstein, 245 Fifth avenue, New York.

NEW YORK—Metropolitan Air Conditioning Corp. has been incorporated with 500 shares preferred and 1500 shares common, to manufacture air conditioning devices, by Richard P. Charles, 7410 Ridge boulevard, Brooklyn, N. Y., and associates.

New Jersey

BOUND BROOK, N. J.—Midland Tube & Pipe Co. has bought a 1-story steel mill building and four acres at Bound Brook and will equip it for the manufacture of pipe and tubes. The plant formerly was occupied by the American Ball Engine Co.

JERSEY CITY, N. J.—Hoffman-Elias Co. has been incorporated with 200 shares no par value to manufacture machinery, by John G. Flanigan, 1 Exchange place, Jersey City, N. J.

NEWARK, N. J.—Newark Steel Treating Co. has been incorporated with 101 shares no par value to heat treat metals, by George & Werthmann, 20 Clinton street, Newark, N. J.

NEWARK, N. J.—Wendel Metal Products Co. has been incorporated with 24 shares no par value to manufacture metal products, by Meyers & Lesser, 60 Park place, Newark, N. J.

Pennsylvania

BEAVER FALLS, PA.—Ingram-Richardson Mfg. Co., Beaver Falls, metal signs, is operating at full capacity with three 8-hour shifts and an increase of 50 percent in workers. Improvements to cost $75,000 will be made if the increased business continues.

BRADFORD, PA.—City officials are considering plans for the construction of a municipal gas plant. C. H. Messerly, Bradford, is in charge.

GLENSHAW, PA.—Thomas Spacing Machine Co. has been awarded a contract to repair 1100 voting machines for Allegheny county at $123,000. The only other bid was $167,000 by the Automatic Electric Co., Chicago.

MEADVILLE, PA.—Valley Mead Brewing Co. is having plans made for additions and alterations in its brewing plant at a cost of about $250,000. Braziell & Anderson, 309 Fourth avenue, Pittsburgh, are architects.

PITTSBURGH—Construction of a dam and lock in the Allegheny river above Pendleton, Pa., is promised from an item of $4,500,000 included in the rivers and harbors bill being drafted at Washington.

YORK, PA.—S. Morgan Smith Co. has been awarded a contract to furnish gate-operating machinery for locks No. 2 and 3, Allegheny river, by the Vang Construction Co., Pittsburgh.

Ohio

CINCINNATI—Metal Artisans Inc. has been incorporated with 250 shares no par value, by Strasser, Lillie & Schussler, 804 Second National Bank building, Cincinnati.

CLEVELAND—Downtown Sheet & Metal Co. has been incorporated with 250 shares no par value, by A. J. Litt, 1013 Society for Savings building, Cleveland.

CLEVELAND—Gas-Electric Motors Inc. has been incorporated with 500 shares no par value, by Treadway & Marlatt, 1259 Union Trust building, Cleveland.

CLEVELAND—Ohio Smelting Co. Inc. has been incorporated with $5000 capital by Rocker & Schwartz, 717 Guardian building, Cleveland.

NEWARK, O.—Buckeye Rolling Mill Co. has been incorporated with $50,000 capital, by Gordon D. Kinder, Martins Ferry, O.

Michigan

DETROIT—Detroit Edison Co. is completing specifications for a substation to be erected adjacent to the new plant of the Rotary Electric Steel Co.

DETROIT—Hare Stoker Corp., 2767 Woodward avenue, has been incorporated with $25,000 capital and 7500 shares no par value to manufacture stokers, by W. A. Hare, 4853 Rivard street, Detroit.

DETROIT—Stran-Steel Corp., 3600 Military avenue, has been incorporated with 1000 shares no par value to fabricate steel products, by Carl A. Strand, 8429 Epworth boulevard, Detroit.

DETROIT—Covered Wagon Co., 11855 East Jefferson street, has been incorporated with $50,000 capital to manufacture automotive trailers, by Arthur G. Sherman, 475 Ashland avenue, Detroit.

MUSKEGON, MICH.—Austin Trailer Equipment Co., 2999 Lake Shore drive, has been incorporated with 1000 shares no par value to manufacture vehicles, by O. A. Seyferth, Lake Harbor, Mich.

Indiana

TERRE HAUTE, IND.—Wabash Boiler & Conveyor Co. has been incorporated with 1000 shares no par value to manufacture and repair boilers and conveyors, by Frank P. Walters and associates.

Illinois

CHICAGO—Columbia Gas Machine Mfg. Co., 100 North LaSalle street, has been incorporated with 100 shares no par value to manufacture machinery, by John R. Watt, 111 West Washington street.

CHICAGO—Midvale Iron & Supply Co., 80 East Jackson boulevard, has been incorporated with $20,000 capital to deal in iron, steel and metal scrap, by Weissenbach, Hartman, Craig & Okin, 7 South Dearborn street, Chicago.

CHICAGO—Davies Cement Construction Co., 1331 South Kostner avenue, has been incorporated with $5000 capital to conduct an engineering business, by A. N. Lustig, 139 North Clark street, Chicago.

CHICAGO—Universal Flow Valve Control Corp., 29 South LaSalle street, suite 534, has been incorporated with 1000 shares no par value to manufacture machinery and appliances, by Ross D. Netherton, 29 South LaSalle street.

GRANITE CITY, ILL.—National Enameling & Stamping Co. plans to manufacture steel kegs at its plant here and probably also at its New York plant. Some new equipment will be needed.

ROCKFORD, ILL.—Dolkoff Iron & Metal Co. has been incorporated with $10,000 capital to deal in iron and steel scrap, by Julian Dolkoff and Eli B. Langert.

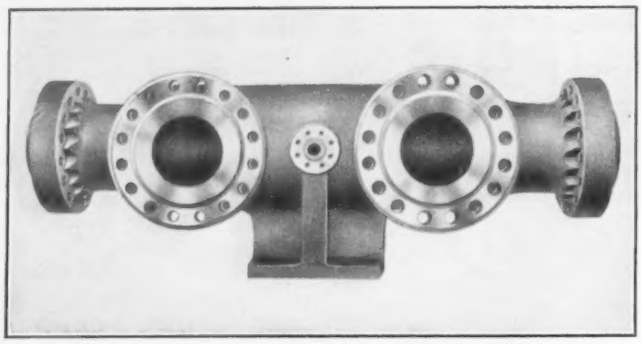
Southern States

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids as follows: May 16, schedule 82, one motor-driven trimming and squaring shears; schedule 85, one motor-driven power press; schedule 35, one motor-driven precision toolmakers lathe, for Anacostia, D. C.; May 23, schedule 37,504 flush point pneumatic riveting hammer rivet sets, for puget Sound, Wash.; schedule 38, 3000 safety treads, for Brooklyn, N. Y.; schedule 39, 17,300 single-trip steel containers, for San Francisco, Calif.; schedule 57, two honing-type cylinder grinding machines.

Missouri

ST. LOUIS — Myers Engineering Equipment Co., Mart building, has been incorporated by G. Myers to manufacture and install air conditioning and allied equipment.

ST. LOUIS—St. Louis Lift & Equipment Co. has been incorporated



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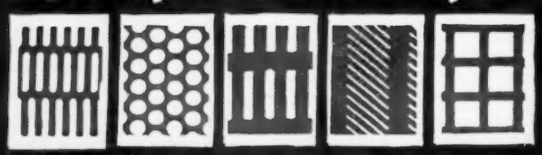

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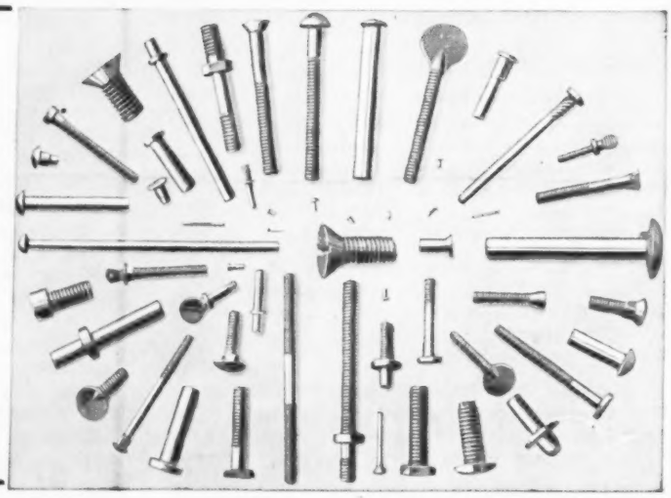

to manufacture automotive lifts for garages and filling stations, as a subsidiary of the St. Louis Car Co. E. B. Meissner, 8000 North Broadway, is president.

Oklahoma

MANNFORD, OKLA.—Carl Wolfe, Box 224, Mannford, Okla., plans to establish a machine shop on highway 33, near here. He now operates a welding and repair shop.

Texas

DALLAS, TEX.—Atlantic Pipe Line Co., Magnolia building, plans two pumping stations on its East Texas line. Contracts reported let to Byron Jackson Co., Berkeley, Calif., for four centrifugal pumps, diesel engine driven, two for each station. J. W. Williams is chief engineer in charge of construction.

FORT WORTH, TEX.—Poole's Easy Sealer Co., 1106 Hemphill street, has started production of metal sealers and canning devices.

FORT WORTH, TEX.—Thomas S. Byrne, Fort Worth National Bank building, has been given contract for a hangar, 135 x 200 feet, including repair shop, by the southern division American Airways headquarters here. The cost is estimated at $150,000.

HOUSTON, TEX.—Boiler Specialty Co., 8308 LaPorte road, has been organized to deal in oil field equipment and repairs. M. G. Miller is manager.

HOUSTON, TEX.—Newco Mfg. Co., 2807 Navigation boulevard, has started operations in a plant producing oil pumps. G. A. Alviset is manager.

HOUSTON, TEX.—Ryan Tool Service has been established at 4020 East Montgomery road to repair and recondition oil field tools. C. F. Ryan is manager.

LONGVIEW, TEX.—Gregg-Tex Gasoline Co., ElDorado, Ark., plans to establish a gasoline plant in the oil fields near here. Equipment will be taken from a dismantled plant. J. W. Olvey, ElDorado, Ark., is president.

PLAINVIEW, TEX.—Montgomery & Ward, Harvey-Snider building, Wichita Falls, Tex., are consulting engineers for the city of Plainview in connection with a power plant for which $50,000 bonds have been voted.

SAN ANTONIO, TEX.—Vapo-Gas Corp. has been incorporated with $10,000 capital to manufacture combustion devices, by O. T. Dix, secretary.

Wisconsin

ANTIGO, WIS.—Vulcan Corp., manufacturer of shoe lasts, will build a plant addition 30 x 120 feet and will install a blower system and enlarge its dry kilns.

BELOIT, WIS.—James P. Jorgenson, 624 Third street, general machine shop, has developed a new type of taper tool, now being placed on a production basis, designed for production of golf club shafts, billiard cues and similar articles.

BEAVER DAM, WIS.—State board of health has ordered the city to start work immediately on construction of a sewage disposal plant to be in operation not later than Nov. 1. William A. Gergen is city clerk.

CUDAHY, WIS.—Crown Vending Equipment Co. is starting manufacture of a new type of merchandising vending machine designed by J. F. Dohrwardt, work being under way on the first order for 625 machines.

FOND DU LAC, WIS.—Damrow Bros. Co., manufacturer of supplies and equipment for creameries and cheese factories, will build a 1-story steel addition, 120 x 156 feet, for use by Oct. 1, when leased space will be vacated. E. C. Damrow is president.

MILWAUKEE—Gus E. Strandt, 2517 North Forty-seventh street, will build a machine shop 30 x 110 feet on Thirty-third street near Burleigh street.

MILWAUKEE—American Products Co., 3045 West Walnut street, is remodeling a malt warehouse nearby into a brewery to be operated by the Fischbach Brewing Co., Walter Fischbach president.

MILWAUKEE—Lloyd H. Draeger has established a shop for the manufacture of a ball-and-socket trailer hitch of his own design. He formerly was designing engineer for the Chain Belt Co. Headquarters are at 2226 North Forty-fourth street.

MILWAUKEE—Assets of the Milwaukee Tank Works Inc., 728 East Nash street, have been bought at trustees' sale by Charles D. Ashley, and associates, who will continue the business as the Milwaukee Pump & Tank Works Inc.

MILWAUKEE—Badger Meter Mfg. Co., 2371 North Thirtieth street, has taken an order for 30,000 water meters from Mexico City federal district authorities. This will increase its rate of production 40 per cent for at least six months.

MILWAUKEE—Main building of the Wisconsin Gray Iron Foundry Co., 4432 West Burnham street, was wrecked by fire with loss of $100,000. John A. Burke is president and means will be taken at once by him to rebuild or lease a plant for continuance of production.

MILWAUKEE—Liberty Tool & Machine Co., 2161 South Kinnickinnic avenue, recently in receivership, has been succeeded by Peters Tool & Machine Co., Henry G. Peters president and treasurer. A government order for auxiliary gasoline tank covers for aircraft is engaging its capacity at present.

SHEBOYAGAN, WIS.—Modern Auto Parts Co. will build a 1-story fireproof machine shop extension, 30 x 75 feet, and additional equipment is being purchased. Rance Loop is president and general manager. The company manufactures automotive replacement parts and accessories.

Utah

SALT LAKE CITY, UTAH—Manning Gold Mining Co., care W. F. Snyder, Felt building, Salt Lake City, plans construction of a 600-ton cyanide mill at Manning mine, near Mercur, Utah. J. C. Ingersoll is engineer.

SALT LAKE CITY, UTAH—U. S. Smelting & Refining Co., D. D. Muir vice president, Newhouse building, Salt Lake City, plans a lead smelter at its plant at Midvale, Utah, to cost about $100,000.

Pacific Coast

PORTLAND, OREG.—L. H. Hoffman, Public Service building, has been awarded the general contract for remodeling the plant of the Henry Weinhard Brewing Co., at a cost of about $300,000.

ABERDEEN, WASH.—Bids have been taken by the city council for wood pipe replacements for the Wishkah water system, including 20,000 steel bands.

BELLINGHAM, WASH.—George W. Reilley, superintendent of the water system, has been given authority by the city council to build a chlorinating plant at lake Padden.

BREMERTON, WASH.—Kitsap Brewing Co. has been organized with $6000 capital, by H. B. Howe and associates.

PORT ANGELES, WASH.—Peter Wilhelm, formerly of Fresno, Calif., is planning construction of a 35-barrel beer plant here, to start operations about July 1.

SEATTLE—Durable Mat Co., 2718 Sixteenth avenue S. W., is developing a new type of placer equipment designed by A. C. Stewart, an Alaska mining engineer.

SEATTLE—William Wadleigh, 902 North Eighty-fifth street, is building a foundry, 40 x 65 feet, at 329 West Ewing street. Plans are by William Brust, architect.

SEATTLE—Milwaukee brewing interests are incorporating the Coast Malting Co. with the intention of establishing a $200,000 plant at Puyallup, Sumner or Auburn, Wash., in the hop fields. A $100,000 elevator is included.

Dominion of Canada

TORONTO, ONT.—Gray Bonney Tool Co. Ltd., a subsidiary of the Bonney Forge & Tool Co., Allentown, Pa., has been formed and arrangements have been made with Gray Forgings & Stampings Ltd., 686 St. Clarens avenue, Toronto, to manufacture the Bonney line of goods.

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